

**WORK PLAN**

**PRE-REMEDIAL DESIGN  
FIELD INVESTIGATION  
SUBUNIT B/C  
PHOENIX-GOODYEAR AIRPORT  
SUPERFUND SITE  
GOODYEAR, ARIZONA**

Submitted To:

**The Goodyear Tire & Rubber Company  
1144 East Market Street  
Akron, Ohio 44303**

By:



**METCALF & EDDY, INC.  
2800 Corporate Exchange Drive, Suite 250  
Columbus, Ohio 43231**

**February 21, 1992**

**Revised April 3, 1992**

February 21, 1992

Mr. Craig Cooper  
U.S.EPA, H-7-2  
75 Hawthorne Street  
San Francisco, California 94105

Subject: Work Plan  
Pre-Remedial Design Field Investigation Work Plan,  
Subunit B/C  
Phoenix-Goodyear Airport Superfund Site  
Goodyear, Arizona

Dear Mr. Cooper:

Enclosed is one copy of the Work Plan for the Pre-Remedial Design Field Investigation of Subunit B/C at the Phoenix-Goodyear Airport Superfund Site in Goodyear, Arizona for your review. This Plan is submitted on behalf of The Goodyear Tire & Rubber Company in accordance with the Consent Decree (Section VII, paragraph D, subparagraph 16, page 22).

We have also sent one copy to each of the following:

Moses Olade - Arizona Department of Environmental Quality  
Grant Gibson - Arizona Department of Water Resources  
Larry Smith - URS Consultants

If you need additional copies or have questions, please call Ed Waltz of Goodyear or me at the number below.

Sincerely,  
METCALF & EDDY, INC.



Todd Struttman, P.E.  
Senior Project Engineer

Enclosures

cc: E. Waltz-Goodyear  
M. Olade-Arizona D  
G. Gibson-Arizona D  
L. Smith-URS

# M&E Metcalf & Eddy

An Air & Water Technologies Company

April 3, 1992

Mr. Craig Cooper  
U.S. EPA H-7-2  
75 Hawthorne Street  
San Francisco, CA 94105

Subject: Responses to Comments  
Phoenix-Goodyear Airport Superfund Site (south)  
Final Remedy Consent Decree, No. 88-1442 PHX EHC  
Subunit B/C Field Investigation Work Plan, Goodyear, Arizona

Dear Mr. Cooper:

Attached are responses to U.S.EPA comments on the B/C Field Investigation Work Plan dated February 21, 1992 for the Phoenix-Goodyear Airport Superfund Site in Goodyear, Arizona. These responses are submitted on behalf of the Goodyear Tire and Rubber Company. The revised pages are also attached. Goodyear is proceeding with the activities in the work plan and is currently developing the specifications for the monitoring wells. Prior to installation of the monitoring wells, procedures for sampling the multi-port monitoring wells will be submitted for approval and later incorporation into the overall site monitoring plan.

The revised pages replace in kind the draft pages. Those pages are as follows.

Cover and binder spine

Executive Summary:

Section 1:

Section 4:

Section 6:

Section 7:

Section 9

Pages ES-i, ES-v

Page 1-1

Pages 4-1, 4-2, 4-5, 4-12;

Figures 4-4 and 4-5

Page 6-3


Page 7-1

Page 9-1

If you have any questions, please call Ed Waltz or me.

Sincerely,

METCALF & EDDY, INC.

  
Todd Struttman, P.E.  
Senior Project Engineer

TJS/J-6791

cc: E. Waltz, Goodyear Tire and Rubber Company  
M. Olade, Arizona Department of Environmental Quality  
G. Gibson, Arizona Department of Water Resources  
L. Smith, URS Consultants  
R. Bartholomew, Bartholomew Engineering

Encl: Attachment 1 (Responses to U.S.EPA comments on the Draft B/C Work Plan)

2800 Corporate Exchange Drive, Suite 250, Columbus, OH 43231  
614-890-5501 FAX 614-890-7421



## ATTACHMENT 1

### RESPONSES TO COMMENTS BY U.S. EPA REGARDING THE PRE-REMEDIAL DESIGN FIELD INVESTIGATION FOR SUBUNIT B/C AT THE PHOENIX-GOODYEAR AIRPORT SUPERFUND SITE

APRIL 3, 1992

The following comments were provided by EPA in response to review of Work Plan; Pre-Remedial Design Field Investigation Subunit B/C; Phoenix-Goodyear Airport Superfund Site; Goodyear, Arizona dated February 21, 1992 submitted by the Goodyear Tire & Rubber Company.

#### Comments

1. Section 3.2, pages 3-4 thru 3-11. No response required.

**Comment:** Although EPA agrees with Goodyear's interpretation that current data indicates that the Phillips well and RECMET2 yield water more like Subunit A than Subunit C, the requirements of Section VII.C.2. of the Consent Decree regarding well-head treatment requirements still apply to these two wells. Furthermore, in order to gather more information confirming that the contamination in RECMET2 and Phillips wells are localized at each well, Goodyear may wish to consider gathering additional groundwater quality data between the Subunit A Treatment System injection field and the Phillips well.

2. Section 4.2, page 4-4, top paragraph. No response required.

**Comment:** EPA understands the reference to access restrictions here is to physical and not legal barriers to the property in question. If this is not the case, please explain.

3. Section 4.3.7, page 4-12. Response required.

**Comment:** Based on recent diagnostic tests, is a monitoring well down gradient from PLA#4 still warranted?

**Response:** A monitoring well is not required downgradient of PLA#4. The diagnostic testing on PLA #4 conducted in February 1992 did not indicate a casing leak in well PLA #4. The character of the temperature log and the lack of detection of TCE in the well support the conclusion that the well does not provide a conduit for TCE contamination from Subunit A to Subunit C. Furthermore, this well is outside and upgradient of the contaminant plume currently defined in Subunit A.

To clarify the text, Page 4-12 of Section 4.3.7 was changed to reflect that the installation of the monitoring well down gradient of PLA#4 will not be installed based on the results of the diagnostic testing of PLA#4 conducted in February 1992. Additionally, Figure 4-5 has been changed to reflect one less monitoring well.



4. Section 5.3, page 5-4. No response required.

**Comment:** Reinjection of treated Subunit B/C water is likely an acceptable end-use option to EPA, ADEQ, and ADWR. Goodyear should complete its end-use analysis and recommend an alternative to EPA as soon as possible. Implementation of an end-use alternative different than what is selected in the 1989 Record of Decision (ROD) may require a ROD modification.

5. Section 6.2, page 6-1. No response required.

**Comment:** Due to previous experiences with multi-level groundwater monitoring wells, such as Westbay's MP-System, in Arizona, Goodyear should take great care in selecting a drilling contractor with experience in the installation of such wells.

6. Section 6.4.1, page 6-3. Response required.

**Comment:** Goodyear shall inform EPA of drill cuttings sampling results and a recommended disposal method prior to implementation of the appropriate disposal method.

**Response:** Goodyear will provide U.S. EPA with sampling results and a recommended disposal method prior to implementation of disposal. The text in section 6.4.1 has been modified to reflect this change.

7. Section 7.0, page 7-1. Response required.

**Comment:** EPA is not in receipt to the Sampling and Analysis Plan written by ICF and Bartholomew Engineering, dated November 1991. The current sampling and analysis plan for PGA-south is the document entitled Monitoring Plan, Phoenix-Goodyear Airport; Operable Unit 16. Phase I & II - Subunit A ("Monitoring Plan") dated June 10, 1991'. As stated on page 1-1 of this document, the Monitoring Plan serves as an interim plan for Subunit B/C until which time a separate Subunit B/C Monitoring Plan can be prepared. However, the Monitoring Plan does not address the new multi-level wells described in the Subunit B/C Work Plan. Therefore, prior to sampling of any wells proposed by the Subunit B/C Work Plan, Goodyear must have EPA-approved sampling and analysis procedures for those wells. Goodyear may choose to modify and re-submit the Monitoring Plan or prepare and submit a separate Subunit B/C Monitoring Plan.

As a brief history, by letter dated July 21, 1991, EPA directed Goodyear to follow the June 1991 Monitoring Plan until EPA comments are addressed in the next update of this plan. By letter dated November 5, 1991, Goodyear's consultant, ICF, informed EPA that in response to EPA's comments enclosed with its July 21 letter, an updated version of the Monitoring Plan (dated November 1991) had been forwarded to Dick Bartholomew and his field staff. Shortly thereafter, EPA agreed that Goodyear may postpone formal resubmission of the Monitoring Plan until the following occurs:

- (a) Goodyear identifies and recommends the monitoring wells and other additional sampling points related to Operable Unit-Phase II;

- (b) shared monitoring arrangements between Goodyear and City of Phoenix are established;
- (c) benzene, ethylbenzene, and total petroleum hydrocarbon standards are established by EPA and ADEQ; and,
- (d) Goodyear's south of Highway 85 investigations are completed.

Therefore, EPA is currently awaiting Goodyear's formal resubmission of the Monitoring Plan based on the outcome of the above events.

**Response:** Prior to sampling of the proposed Subunit B/C monitoring wells, Goodyear will prepare, for U.S. EPA approval, a technical memorandum for sampling the multi-port monitoring wells. This technical memorandum will later be incorporated as a section in the overall monitoring plan for the site. This approach will facilitate both the short term goal of having an approved monitoring plan for sampling the multi-port wells as well as the long term goal of having an overall monitoring plan for the entire site. The sampling procedures and analytical methods already approved in the monitoring plan will be used for the multi-port wells because these procedures are consistent with the Final Remedy Consent Decree and already approved by the U.S. EPA.

# **WORK PLAN**

## **PRE-REMEDIAL DESIGN FIELD INVESTIGATION SUBUNIT B/C PHOENIX-GOODYEAR AIRPORT SUPERFUND SITE GOODYEAR, ARIZONA**

**Submitted To:**

**The Goodyear Tire & Rubber Company  
1144 East Market Street  
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2800 Corporate Exchange Drive, Suite 250  
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**February 21, 1992**

*revised April 3, 1992*

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### LIST OF ACRONYMS

PGA	- Phoenix-Goodyear Airport
TCE	- Trichloroethene
UPI	- Unidynamics-Phoenix, Inc.
GAC	- Goodyear Aerospace Corporation
LCU	- Lower Coarse - Grained Unit
MFU	- Middle Fine - Grained Unit
UAU	- Upper Alluvial Unit
AMSL	- Above Mean Sea Level
VOC	- Volatile Organic Compound
ADHS	- Arizona Department of Health Services
PLA	- Phoenix-Litchfield Airport
COG	- City of Goodyear
PCE	- Perchloroethene
ADWR	- Arizona Department of Water Resources

# **Executive Summary**

## EXECUTIVE SUMMARY

The Goodyear Tire and Rubber Company (Goodyear) contracted with Metcalf & Eddy, Inc. (M&E) to prepare a Field Investigation Work Plan (the Plan) for remediation of the hydrogeologic units lying immediately below the water table aquifer\* (Subunits B and C, respectively) at the Phoenix-Goodyear Airport (PGA) Superfund Site. Goodyear was required to prepare a Field Investigation Work Plan as part of the overall remediation effort agreed to in the Consent Decree between Goodyear and the U.S. EPA (Section VII, Subsection D, Number 16, Page 22).

The Plan is required to define the field work necessary to collect sufficient data for design of a ground-water extraction system. The purpose of the ground-water extraction system is to hydraulically contain all substances in the ground-water in Subunits B and C that exceed clean-up standards (as listed in Table 2-5 of the 1989 Record of Decision). Trichloroethene (TCE) is the major contaminant of concern at the site. This Plan describes:

- The source, migration pathways, and extent of TCE contamination in the second aquifer (Subunit C);
- A proposed program to fill gaps in data required to delineate the extent of TCE contamination;
- Methods for determining the vertical and horizontal extent of contamination;
- Criteria for the location of four additional multiscreen monitoring wells;
- Methods for installing the new monitoring wells;

---

\* Subunit B is a leaky aquitard and Subunit C is called the second, or "deep" semi-confined aquifer. They are referred to collectively as Subunit B/C.



- Methods for determining design requirements for the extraction system; and
- A proposed schedule of activities.

In brief, this plan is designed to accomplish the following objectives:

- Resolve remaining uncertainties concerning the movement of TCE into Subunit C by routes afforded by the construction methods and physical condition of the existing production wells at the northeast corner of the site and leakage through Subunit B.
- Define the extent of the contaminated ground-water plume by using a phased approach in the installation of additional monitoring wells.
- Provide data for and produce the design of a ground-water extraction system that, when coordinated with the existing extraction system for the water table aquifer (Subunit A), will provide for hydraulic capture and subsequent remediation of the contaminant plume of TCE to meet the cleanup standard for Subunit C.

This Plan will use laboratory QA/QC Plan approved for the ICF and Bartholomew Engineering Sampling and Analysis Plan (November 1991) and a Metcalf & Eddy corporate Health and Safety Plan (included as an appendix) for the site modeled after the existing Health and Safety Plan approved for operations at the site. For reference, the Consent Decree is also included.

The PGA site is 17 miles west of Phoenix, Arizona, in the western part of the Salt River Valley. The upper 300 feet of the basin fill, called the Upper Alluvial Unit, is the hydrologic unit of concern at the site. This unit is divided into three Subunits. Subunit A, an unconfined aquifer, extends from the ground surface to 110 feet below the surface. Subunit B, a leaky

aquitard, extends from 110 to 160 feet below the surface, and Subunit C, a semi-confined aquifer, extends from 160 to 310 feet below the surface.

Ground-water is currently being extracted from Subunit A and treated for removal of TCE. Additionally, a vapor extraction system is being designed to remove TCE from the vadose zone.

TCE has been detected above the clean-up standard of 5  $\mu\text{g/l}$  in Subunit C in the northeast part of the airport in industrial water supply wells. These "facility" water supply wells include the four wells on the former Goodyear Aerospace Corporation property and the five wells on the current airport property [Phoenix-Litchfield Airport (PLA)]. TCE was also detected above 5  $\mu\text{g/l}$  in one monitoring well cluster 16GMW-1 located between two of the facility production wells (GAC#2 and GAC#3) in the northeast corner of the facility. Sampling of ground-water monitoring wells installed downgradient (west) of the airport facility production wells did not reveal TCE above the clean-up standard of 5  $\mu\text{g/l}$ .

During RI/FS sampling in 1987, TCE concentrations greater than the clean-up standard were detected in the facility production wells and in two additional wells located off site: the Phillips Well (6,800 feet west of the runway) and the Reclaimed Metals #2 (RECMET2) Well (1,600 feet west of the southern end of the airport) (U.S. EPA, June 1989). However, in July 1990 and July 1991 sample results indicated TCE concentrations less than the clean-up standard in the Phillips and RECMET2 wells.

An evaluation of the nine facility production wells, all of which penetrate Subunit C, indicate that casings have deteriorated in four wells, allowing contaminated ground-water in Subunit A to enter the wells. All nine wells were drilled using the cable tool method, and production zones were not sealed from the overlying hydrostratigraphic units. Each well penetrates, from the top down, the TCE-contaminated Subunit A, the aquitard Subunit B, and Subunit C. It is believed that the nine facility production wells provide potential routes of migration of TCE-contaminated ground-water from Subunit A to Subunit C.

The interpretation by M&E as to the extent of ground-water contamination differ significantly from that presented in the U.S. EPA RI/FS report. M&E's interpretation of the Subunit C TCE plume concentration map shows contaminant distribution in two to three small, locally distributed plumes centered around the facility water production wells, all confined within site boundaries.

The U.S. EPA report defined the plume of TCE-contaminated ground-water (above 5  $\mu\text{g/l}$ ) to extend uninterrupted from the facility production wells west, over 6,800 feet to include the Phillips Well. Limited ground-water quality data was available at the time between the facility production wells and far west to the Phillips Well. Widespread agricultural wells west of the airport contained low concentrations of TCE (below the cleanup standard) which suggested that a diluted plume may have migrated that distance from the airport facility. Some of these wells, however, are located between the Phillips Well and facility production wells. Monitoring well cluster EMW-20, which provides complete vertical coverage of the B/C Aquifer west of facility production wells, detected TCE at concentrations below the cleanup standard. Other monitoring well clusters downgradient of facility production wells including EMW-21, EMW-28, EMW-19, and EMW-18 also indicated that the concentration of TCE downgradient of facility production wells in Subunit C is below the cleanup standard of 5  $\mu\text{g/l}$ .

As stated earlier, the most current sampling of the Phillips Well and RECMET2 indicated the TCE concentration in ground water in that area is less than the cleanup standard. Current data indicates that the plume of TCE-contaminated ground-water is distributed around the facility production wells in two and possibly three distinct plumes.

It was commonly believed that the Phillips Well was providing ground-water data representative of Subunit C because the perforated depth of the well is similar to that of other wells in Subunit C. This, however, is not necessarily the case, as it appears that Subunit A may thicken west of the airport and Subunit B may become more coarse-grained. Ground-water chemical characteristics of the Phillips Well strongly suggest the water obtained from

the well is more representative of water obtained from Subunit A. This supports the idea that ground-water contamination at the airport facility production wells in Subunit C may be unrelated to the concentrations in the Phillips Well.

The installation of the four proposed additional monitoring wells described in this Plan should help define the extent of TCE-contaminated ground-water in the vicinity of the facility production wells. To better define the plume in the vicinity of the facility production wells, more than the proposed four new monitoring wells may be needed. These additional wells will be installed only if the four initial monitoring wells do not define the 5  $\mu\text{g/l}$  TCE plume boundary adequately enough to design the ground-water extraction system.

Design of an effective extraction system for Subunit C will require the additional hydrogeologic data expected to be obtained from the five additional monitoring wells, including well logs, water quality data, and possibly aquifer-test data. Aquifer test data already have been collected in the area of the facility production wells during a pumping test of well GAC #4. If the contamination is found to extend west of the airport, an additional aquifer test may be required in that area.

An analytical approach will be used to determine the location of extraction wells. Candidate locations will be selected to provide a capture radius sufficient to extend slightly beyond the estimated 5  $\mu\text{g/l}$  boundary of the TCE plume. The system will be simulated on the MODFLOW model of the site developed by the Arizona Department of Water Resources and modified and updated by M&E. The results of the simulation will be compared to the results of the analytical method for verification.

Simulated extraction well locations and pumping rates will be modified as required to provide the best potential for capture of the plume. Additionally, a model evaluation will be made of the combined effect on the aquifer system of the present extraction system already in place in Subunit A plus the proposed extraction system in Subunit C. The model also will be used to effectively manage the ground-water extraction program and set pumping

rates in Subunit C to minimize potential flow from the more contaminated Subunit A to Subunit C.

## 1.0 INTRODUCTION

The Goodyear Tire and Rubber Company (Goodyear) contracted Metcalf & Eddy, Inc. to prepare a Field Investigation Work Plan for collection of data required to design a ground-water extraction system to remediate Subunit C at the Phoenix-Goodyear Airport (PGA) Superfund Site. Goodyear was required to prepare a Field Investigation Work Plan (the Plan) as part of the overall remediation effort agreed to in the Consent Decree between Goodyear and the U.S. EPA (Section VII, Subsection D, Number 6, Page 22). To meet this requirement, this Plan has been prepared. The purpose of the pre-remedial design activities is to collect additional hydrogeologic data. These data will be used to design a ground-water extraction system to hydraulically contain all substances in Subunit C that exceed clean-up standards listed in Table 2-5 of the 1989 Record of Decision.

This Plan describes the following:

- The source, migration pathways and extent of TCE contamination in the second aquifer (Subunit C);
- A proposed program to fill gap in data required to delineate the extent of TCE contamination;
- Methods for determining the vertical and horizontal extent of contamination;
- Criteria for the location of four additional monitoring wells;
- Methods for installation of the monitoring wells;
- Methods for determining design requirements for the extraction system; and
- A proposed schedule of activities.

This Plan will use the QA/QC Plan approved for the ICF and Bartholomew Engineering's Sampling and Analysis Plan (November 1991). The Plan includes as appendices a Metcalf & Eddy corporate Health and Safety Plan (Appendix A) for the site modeled after the existing Health and Safety Plan approved for operations at the site. This M&E Plan is considered more stringent than the existing plan. The Consent Decree is included for reference (Appendix B).

## 2.0 BACKGROUND

The site background information presented below was compiled in whole or in part from the following reports:

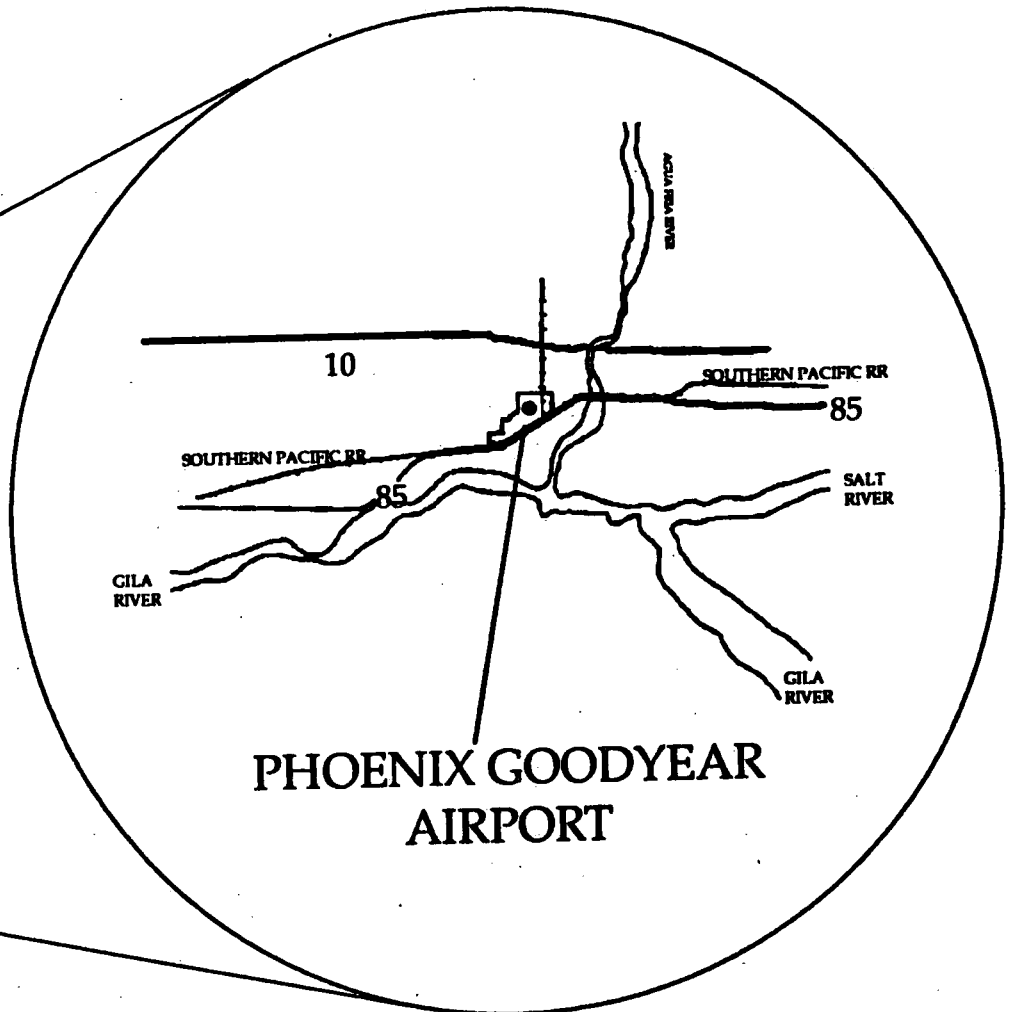
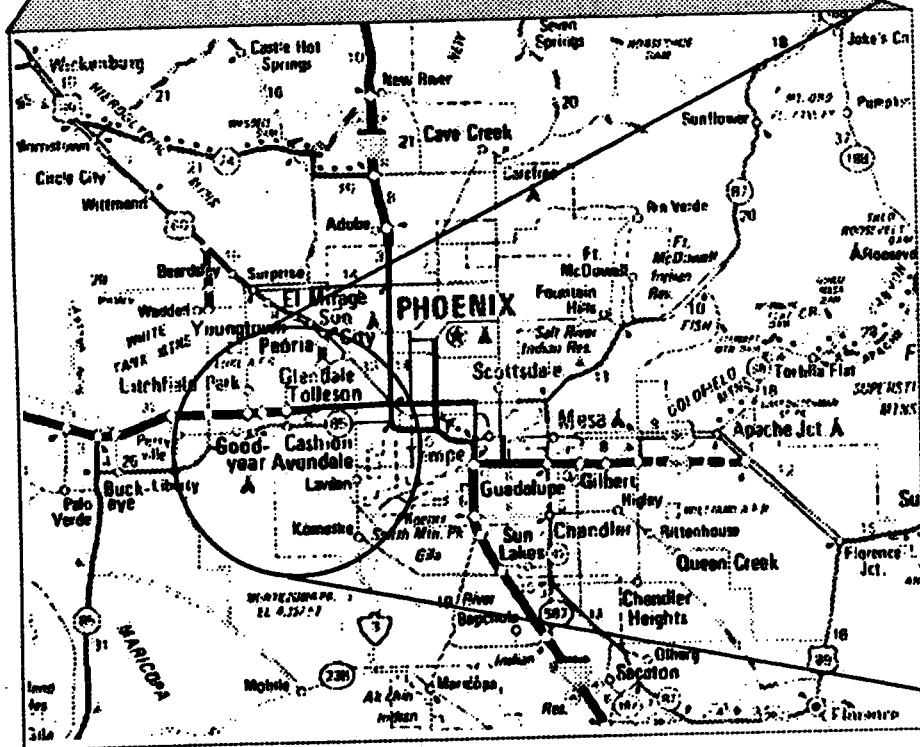
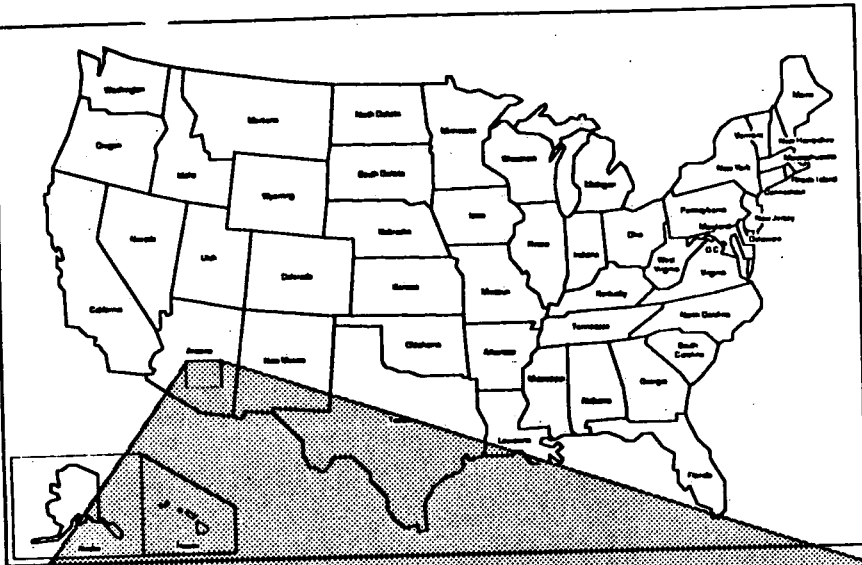
- Remedial Investigation/Feasibility Study (RI/FS) Report, U.S. EPA, June 1989;
- Record of Decision, U.S. EPA, September 1989;
- Health and Safety Plan for Phase II Construction of Extraction and Injection Wells, ICF Technology, Inc. and Bartholomew Engineering, April 1991;
- Source Verification and Field Investigation Report, U.S. EPA, January 1986; and

### 2.1 SITE LOCATION

The PGA site covers an area of about 35 square miles in Maricopa County, Arizona, in the western part of the Salt River Valley, centering about 17 miles west of Phoenix (Figure 2-1). The City of Avondale occupies about 2 square miles along the eastern border of the site. Except for the airport, which is owned by the City of Phoenix, the remainder of the PGA site lies almost entirely within the City of Goodyear.

The site (Figure 2-2, Map Pocket) consists of the airport (owned by the City of Phoenix), and the Loral Corporation Facility. The airport consists of the runway and all associated buildings south of Yuma Road, north of State Route 85, and west of the north-south spur of the Southern Pacific railroad tracks. The airport was formerly called the Phoenix-Litchfield Airport (PLA). The five inactive water production wells still retain the PLA designation. The current Loral Corporation facility, located west of Litchfield Road, south of Yuma Road, and east of the north-south railroad spur, was formerly owned by





Goodyear Aerospace Corporation (GAC). The four water production wells discussed later in the report are named GAC wells after the original owner.

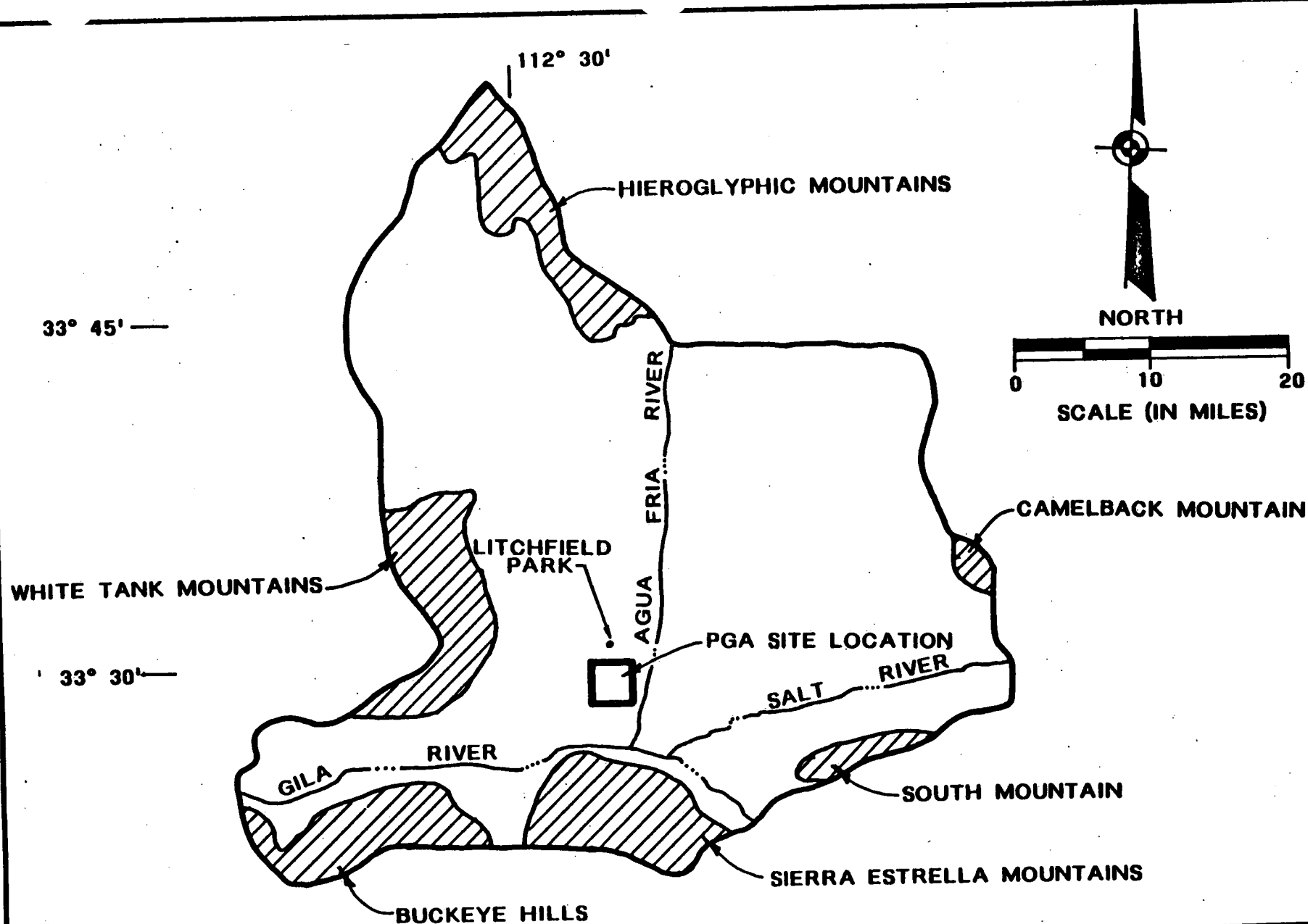
## **2.2 SITE DESCRIPTION**

The PGA Superfund Site lies within a broad alluvial basin in the Basin and Range Physiographic Province. The area is bounded on the south by the Sierra Estrella Mountains. (Figure 2-3). To the north of the Site is the City of Litchfield Park and to the east is the Agua Fria River. The confluence of the Gila and Salt Rivers is about two miles southeast of the site. The Gila River flows from east to west at the southern end of the site. Low flow in the Gila River is mostly due to effluent releases from the 23rd and 91st Avenue Waste Water Treatment Plants and irrigation return flow. The Agua Fria River flows only in response to flood events and releases from upstream dams. Land surface elevations range from less than 900 feet at the Gila River to over 1000 feet above mean sea level (AMSL) near Litchfield Park.

In this arid region, precipitation averages less than 10 inches per year (National Oceanic and Atmospheric Administration, 1986). Extensive agriculture in the PGA area exists through a network of private wells and ground-water supplied canals.

## **2.3 SITE GEOLOGY**

Brown and Pool (1989) divided the rocks of the western Salt River Basin into six separate units; metamorphic and granitic rocks, extrusive rocks, the red unit, and the lower, middle, and upper units of the basin fill. The Upper Basin Fill Unit has been further subdivided into Subunits A, B, and C. (Figure 2-4). The basin fill is in excess of 1,800 feet thick. Metamorphic, intrusive, and extrusive rocks underlie the basin and make up the bedrock of the mountain ranges. The sedimentary basin-fill deposits have been derived primarily from erosion of the surrounding mountains and consist of a complex assemblage of interbedded and discontinuous sedimentary deposits.



GENERAL MAP OF THE WESTERN SALT RIVER VALLEY

### 2.3.1 Hydrogeologic Units

The three primary hydrogeologic units beneath the site include the Lower Coarse-grained Unit (LCU), Middle Fine-grained Unit (MFU), and Upper Alluvial Unit (UAU) (Figure 2-4). The basal part of the LCU is basin-fill, deposited during active faulting and basin subsidence. The remainder of the LCU was deposited following cessation of active faulting (Shafiqullah, et Al, 1980; Brown and Pool, 1989). The MFU and UAU were deposited during continued erosion of the mountain fronts. The MFU displays evidence of the transition from a closed basin to an open basin influenced by a regional drainage system (Brown and Pool, 1989).

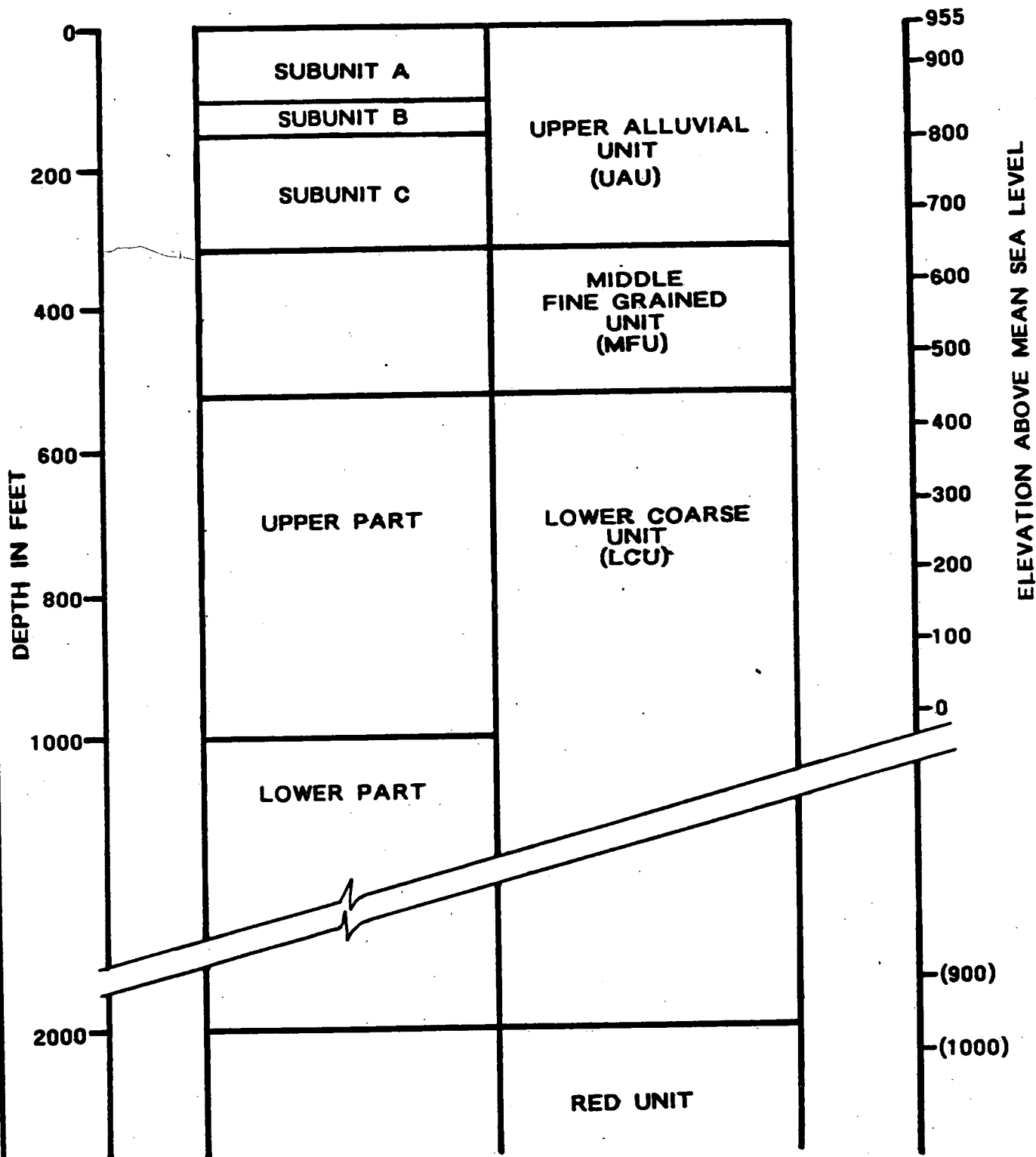
The Upper Alluvial Unit is the hydrogeologic unit that contains contaminated ground-water. This unit is detailed below.

### 2.3.2 Upper Alluvial Unit

The Upper Alluvial Unit (UAU) consists of poorly- to well-sorted gravel, sand, silt, and clay deposited in stream channels, floodplains, and alluvial fans. The UAU is separated into Subunits A, B, and C (Figure 2-4) based on lithologic interpretation (U.S. EPA, June, 1989), and consists of a complex sequence of alluvial sediments that vary over a wide range both vertically and laterally in lithologic character. In general, the uppermost subunit, Subunit A, is considered an unconfined aquifer. Subunit B is a leaky aquitard, and Subunit C is a semi-confined aquifer (U.S. EPA, June, 1989). The contact between Subunit B and Subunit C appears to be gradational in the vicinity of the site (Brown and Pool, 1989). The contact between the UAU and the MFU units generally is about 320 feet below the land surface or approximately 635 feet AMSL (Figure 2-4).

#### 2.3.2.1 Subunit A

Subunit A extends from the ground surface (955 AMSL) to a depth of about 110 feet. The contact between Subunits A and B is at a higher elevation in the north than in the south (southern end of runway). Subunit A consists



**GENERAL STRATIGRAPHIC SECTION OF THE  
BASIN FILL IN THE WESTERN  
SALT RIVER VALLEY**

**Project Number  
006791**

**Figure  
2-4**

generally of 60 to 70 percent material larger than silt-size, however the coarser-than-silt-size fraction can vary locally and may be as low as 10 percent or as high as 90 percent (U.S. EPA, June, 1989).

Subunit A forms an unconfined aquifer with a saturated thickness of 45 to 70 feet. Beneath most of the site, ground-water flow is to the southwest. However, ground-water flow in Subunit A north of the airport is to the north. The U.S. EPA (June, 1989) reported that the transmissivity of Subunit A averages 20,000 gallons per day per foot (gpd/ft), but ranges from 100 to 80,000 gpd/ft.

#### 2.3.2.2 Subunit B

Subunit B is present from the base of the Subunit A, which averages about 850 ft above mean sea level (AMSL), to the top of Subunit C which averages about 800 ft AMSL. The contact between Subunit B and Subunit C generally is higher in the southern part of the site than in the northern part of the site. Although the thickness of Subunit B may average 50 to 60 feet, it ranges from less than 10 feet thick south of the southern end of the runway to almost 170 feet north of the site. Subunit B generally consists of less than 30 percent material coarser than silt size, and is coarsest south and west of the site.

Subunit B is interpreted to be a leaky aquitard between the Subunits A and C (U.S. EPA, June, 1989). The ground-water flow direction in Subunit B varies through the year, from southwesterly during the summer months, when water use is high, to westerly during the winter months, when relatively little ground-water is pumped. The average transmissivity of Subunit B is estimated at 2,000 gpd/ft. Vertical hydraulic conductivity is estimated to range from 0.04 to 4 gallons per day per square foot (gpd/ft<sup>2</sup>) (U.S. EPA, June, 1989).

#### 2.3.2.3 Subunit C

Subunit C extends from the base of Subunit B, which averages about 800 feet AMSL at the site, to the top of the MFU which averages about 685 ft AMSL. The thickness of Subunit C averages about 150 feet and ranges from 80 to 240 feet.

Subunit C generally consists of 60 to 70 percent material larger than silt-size, but the grain size in the unit is highly variable and the amount of material coarser than silt size may range from 10 to over 90 percent. The lower part of the subunit is generally finer-grained than the upper part.

Subunit C is interpreted as a semi-confined aquifer. The regional groundwater flow direction is west. The average transmissivity is reported to be 120,000 gpd/ft (U.S. EPA, June, 1989).

## 2.4 PREVIOUS INVESTIGATIONS

Investigation of the site began in 1981 with sampling of water-supply wells for the City of Goodyear for volatile organic compounds (VOCs) and trace metals by the Arizona Department of Health Services (ADHS). Water-supply wells for the GAC and Phoenix-Litchfield Municipal Airport (PLA) were sampled in December 1981. The ADHS repeated this sampling and extended it to include other wells in the vicinity in June, 1982. The U.S. EPA confirmed the ADHS sampling results in September, 1982. In 1983 ADHS sampled domestic wells to the west of PLA.

Results through October 1983 indicated that there was a small group of production wells within one-half mile of the former GAC facility with TCE concentrations of 30 to 600  $\mu\text{g/l}$ . A few localized areas had wells with concentrations of TCE between 1 and 30  $\mu\text{g/l}$ . The highest concentrations of TCE and other types of VOCs were found in wells within a half mile of the former GAC facility/airport boundary, in the vicinity of the airport facility production wells. The results further indicated that PLA Well #3 New was the only well contaminated with organic contaminants other than TCE.

In 1984, the U.S. EPA sampled community wells as part of the Phase I RI (U.S. EPA, January 1986). The results of these sampling events were consistent with results from the previous sampling programs in the area. The U.S. EPA made sampling rounds of selected production wells until 1990, when Goodyear took over the sampling. The U.S. EPA investigations from 1981 to 1989 were compiled in the RI/FS report June 1989.

### 3.0 DESCRIPTION OF CURRENT CONDITIONS AND INTERPRETATIONS

This section describes current site conditions and interpretations of the contaminant source and distribution in Subunit C. Presented in this section are data gathered from prior investigations, M&E's current interpretation and a discussion of the differences between that interpretation and EPA's interpretation in the Remedial Investigation/Feasibility Study (RI/FS) in 1989.

#### 3.1 DATA FROM PREVIOUS INVESTIGATIONS

A considerable amount of investigatory work has been conducted at the site. Much of this work has focused on Subunit A which is contaminated primarily with TCE. TCE has impacted both the vadose zone and saturated zone of the UAU. The extent of contamination in Subunit A has been defined and the remediation is in progress. Because Subunit A is covered under a separate Consent Order, it is not addressed in this Plan.

Previous investigations identified TCE concentrations in ground-water above 5  $\mu\text{g/l}$  in Subunits B and C. The highest concentrations of TCE in Subunits B and C were detected in the northeastern part of the airport in facility production wells (most of which are inactive). TCE was also detected above 5  $\mu\text{g/l}$  in the Phillips Well, 6800 feet west of the airport runway, and in the Reclaimed Metals #2 (RECMET2) Well, 1,600 feet west of the southern end of the runway (Figure 3-1, Map Pocket). Subsequent sampling of the Phillips and RECMET wells in 1990 and 1991 detected concentrations below the cleanup standards.

The U.S. EPA defined the TCE-contaminated ground-water plume based on all available data at the time of the RI/FS. The definition of the plume was complicated by the paucity of monitoring wells open in Subunits B and C. The data used to define the plume were from wells that were widely spaced and provided little vertical resolution. Moreover, wells used for monitoring the plume west of the airport are mostly privately-owned agricultural wells not designed for the specific purpose of monitoring.



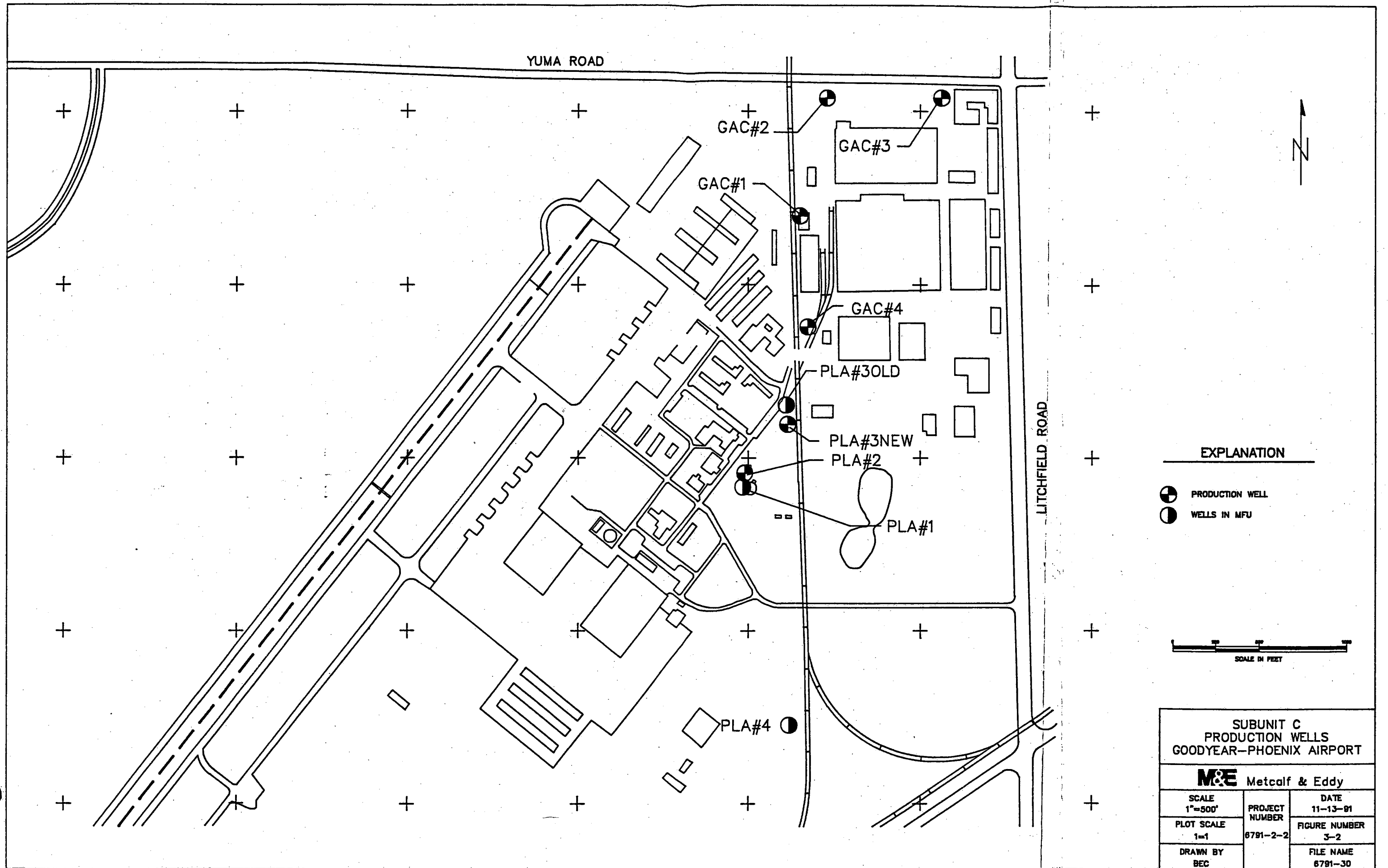
Recent evaluation of the nine facility production wells, all of which penetrate Subunit C, indicate that casings have deteriorated in four wells (GAC #2, #3, #4 and PLA #3 New), allowing contaminated water from Subunit A to enter the wells. One well (GAC #1) does not appear to have casing leaks. The four other wells (PLA #1, #2, #3 Old, and #4) were not tested. The locations of these wells are shown in Figure 3-2.

The current status of the facility production wells is as follows:

<u>Well</u>	<u>Status</u>	<u>Diagnostic Testing</u>	<u>Results</u>	<u>M&amp;E Recommended Action</u>
GAC#1	Inactive	November 1986	No leaks	None
GAC#2	Active	October 1986	Leaks Detected	Plug well
GAC#3	Standby	August 1986	Leak detected	Plug well
GAC#4	Inactive	October 1986	Leak detected	Plug well
PLA#1	Inactive	To be conducted	Not tested	Based on testing
PLA#2	Inactive	To be conducted	Not tested	Based on testing
PLA#3New	Inactive	June 1987	Leak detected	Plug well
PLA#3Old	Inactive	To be conducted	Not tested	Based on testing
PLA#4	Inactive	To be conducted	Not tested	Based on testing

All nine of these production wells were drilled by cable tool methods. As was the typical drilling practice at that time, hydrostratigraphic units above the production zone were not isolated by grouting around the casings. Each of these nine wells extend through Subunit B, the leaky aquitard separating contaminated Subunit A from Subunit C, the production zone. Each of these wells is a potential conduit for contaminants to migrate downward from Subunit A to Subunit C.

Subunit B present throughout this area, is a natural hydraulic retardant to downward migration of contaminants from Subunit A to C, except at the facility production wells which provide specific points of migration of contaminants into Subunit C.



TCE has not been detected in excess of 5  $\mu\text{g/l}$  in downgradient monitoring wells in Subunit C west of the contaminated production wells. An evaluation of the present monitoring system reveals the need to refine the vertical placement of well screens to account for the suspected route of migration of contaminants whether it occurs along the outside of the well casings or through holes and perforations in the casings. A better monitoring system, as described herein, will monitor the aquifer at the screened intervals of the production wells.

### 3.2 CURRENT INTERPRETATION OF CONTAMINANT SOURCE AND TRANSPORT

To remediate the ground-water in Subunit C, one must develop an interpretation of the contaminant sources and how contaminants were transported from the surface to Subunit C. Discussed below is M&E's conceptual model of the contaminant transport mechanism, the distribution of the contaminants, and a discussion of the chemical composition of water in Subunits A and C.

#### 3.2.1 Contaminant Source

Figure 3-3 illustrates the conceptual interpretation of the movement of TCE beneath the PGA site. As shown in the figure, contamination likely stemmed from releases or spills at the surface that percolated into the vadose zone. The layering in the vadose zone would cause the contaminant to spread laterally until the end of a layer and then migrate downward due to gravity and spread due to capillary pressure into the saturated zone. The concentration of TCE in the ground-water in Subunit A is many times lower than the solubility concentration.

TCE was detected in Subunit C in several of the water production wells. There are two potential pathways from Subunit A to Subunit C. One pathway is by percolation through Subunit B, and the second is through anthropogenic structures acting as mechanical conduits between Subunits A and C, such as the leaky production wells which lie within the Subunit A plume. Aquifer tests indicate that Subunit B is a leaky aquitard, but its general contribution of contaminated water to Subunit C is believed to be relatively minor under non-pumping (unstressed) conditions. Based on the aquifer pumping test of GAC #4

(U.S. EPA, 1989, Volume IX), the leakance coefficient ( $P'/m'$ ) is 0.0034 for Subunit B. Assuming an average head difference of 3 feet, the flow rate under unstressed conditions from Subunit A to Subunit C is 0.31 gal/min for every acre. Under unstressed conditions, it is reasonable to attribute contamination in the vicinity of these wells to mechanical conduits afforded by these production wells.

There is evidence of horizontal layering in Subunit C, with zones of high permeability being separated by zones of relatively low permeability. This layering effect is depicted on Figure 3-3, showing how poorly-permeable layers influence the movement of contaminants.

Once the TCE-contaminated ground water migrates from Subunit A to Subunit C, it will move downgradient (by advection) and also laterally (by dispersion). Sampling at different stratigraphic levels in Subunit C is required to delineate the boundary of the TCE-contaminated ground-water plume.

### 3.2.2 Chemical Distribution

The monitoring program described in this Plan is intended to define the plume boundary of 5  $\mu\text{g/l}$ . The lateral extent of the plume will be constrained by placing monitoring wells between the suspected source and downgradient wells that indicate TCE concentrations below 5  $\mu\text{g/l}$ . Determining the vertical distribution of TCE within Subunit C will be accomplished by placing screened intervals at different stratigraphic levels within the subunit. Figure 3-3 shows that conceptually the vertical distribution of TCE is pronounced near the source (production well). As the contaminant migrates by advection and dispersion, the plume spreads laterally and vertically until at some distance from the concentration of TCE will be similar at all stratigraphic levels in Subunit C.

The distance from the source where TCE is equally distributed is unknown at this site, so the six additional monitoring wells will be screened at different levels. This will be accomplished by installing multiple screened

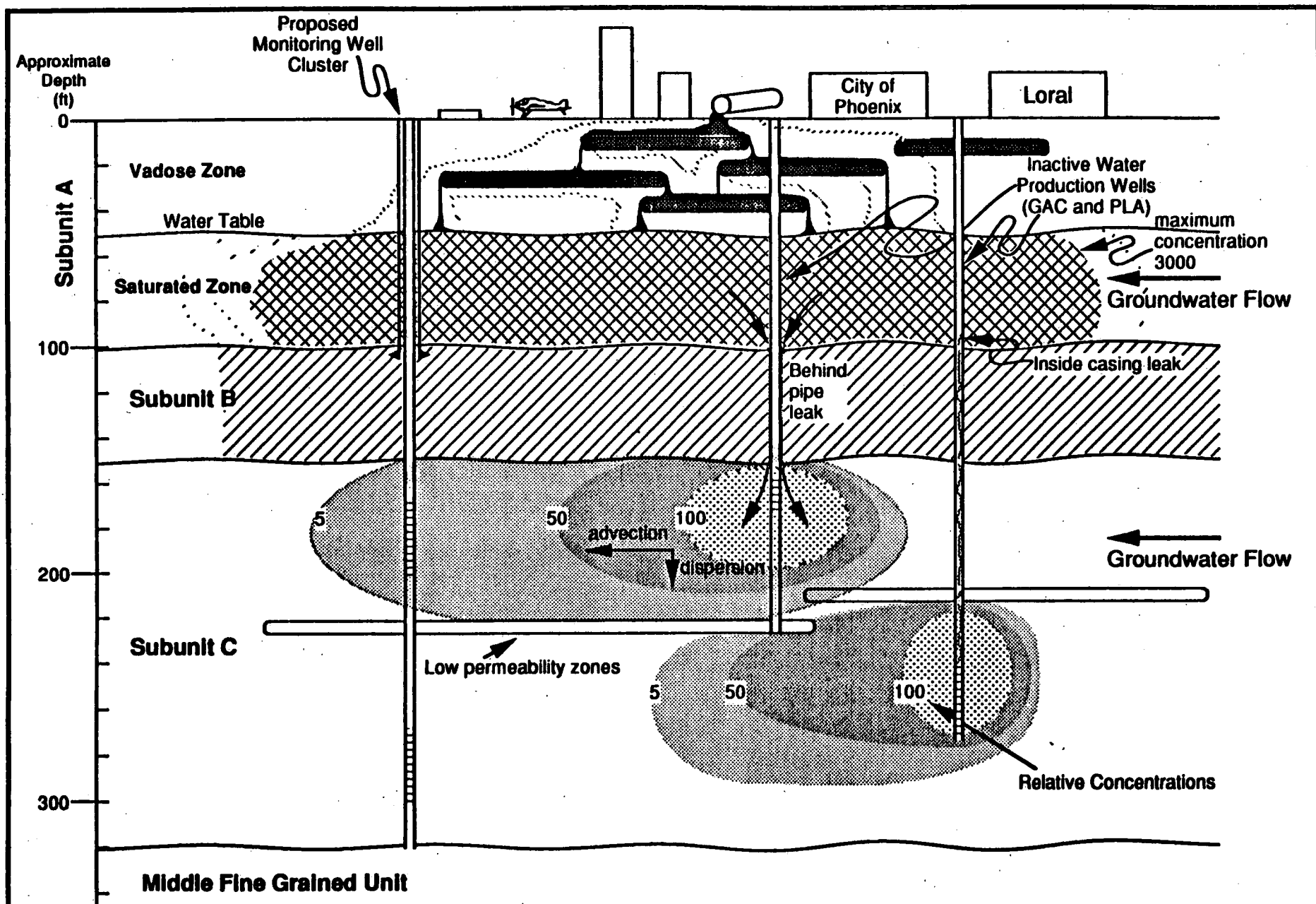
wells that can isolate and sample different stratigraphic levels within Subunit C.

The approach to defining the plume is to locate a monitoring well to delineate the 5  $\mu\text{g/l}$  plume boundary and not overlook a horizontal contaminant pathway. Figure 3-3 shows hypothetical monitoring wells screened at the levels in Subunit C. This proposed monitoring well is screened in two separate permeable zones within Subunit C. Sampling from the upper zone would yield TCE concentrations above 5  $\mu\text{g/l}$  and a sample in the lower zone would yield results below 5  $\mu\text{g/l}$ . At this distance from the source, multiple-screen wells would be required to delineate the vertical distribution of TCE.

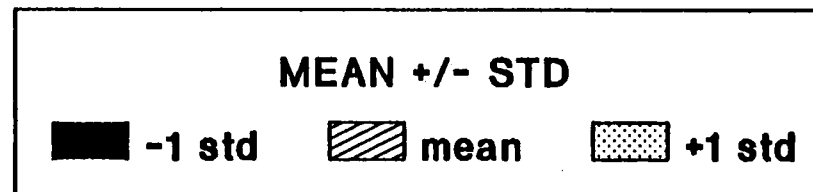
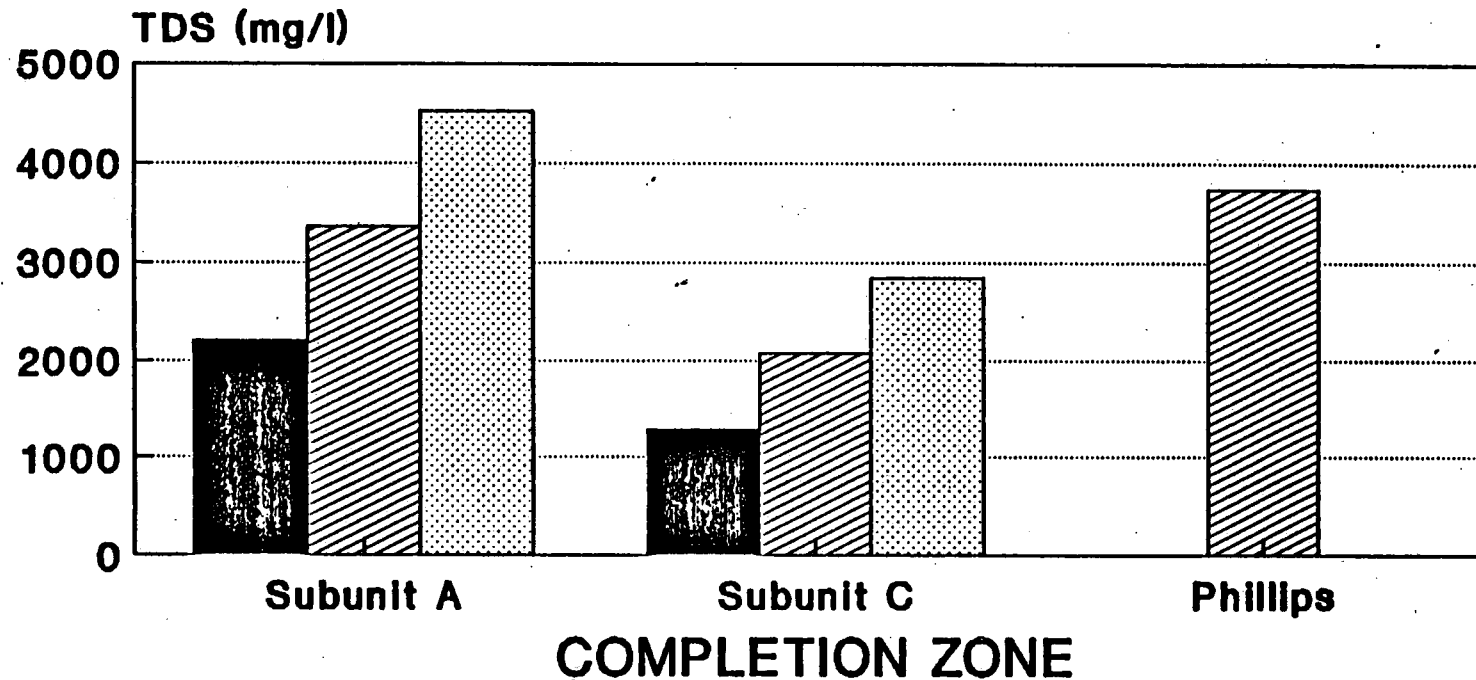
### 3.2.3 Differences in Water Quality Between Subunits A and C

During initial RI/FS sampling, ground-water collected from the Phillips Well contained TCE at concentrations above 5  $\mu\text{g/l}$  (10.3  $\mu\text{g/l}$  average). Ground-water collected in July 1990 and July 1991 did not contain TCE above the 5  $\mu\text{g/l}$  (4.7 and 4.4  $\mu\text{g/l}$  respectively). The completion zone of the well was assumed to be in Subunit C, but the correlation is uncertain because this well is 6,800 feet from the airport. Another method for determining the zone in which this well is completed is based on water quality characteristics.

Distinct differences in the ground-water chemistry exist between Subunits A and C. The total dissolved solids (TDS) in the water collected from Subunit A are generally higher than in water in Subunit C. Additionally, the cation and anion ratios are different in Subunit A and Subunit C. Figure 3-4 shows the TDS concentrations in water collected from Subunit A and Subunit C wells. The wells selected were limited to those that had records of completion and accompanying drilling or geologic logs such that the completion interval is known with confidence. Wells in which Subunit B could not be identified based on the logs were omitted from use as Subunit C wells. Where Subunit B was identified and interpretation, and when screened intervals were not verified to be in Subunit A or B were, wells were omitted from use as Subunit C wells. The statistics presented represent 30 wells in Subunit A and 5 wells in Subunit C. The mean value of TDS in water from Subunit A was 3357 mg/l



**FIGURE 3.4 GROUND WATER CHEMISTRY  
TOTAL DISSOLVED SOLIDS COMPARISON  
SUBUNIT A VS SUBUNIT C**



Subunit A: N=30 wells  
Subunit C: N=5 wells

**Metcalf & Eddy, Inc**

compared with 2070 mg/l in water from Subunit C. Water from the Phillips Well had a concentration of 3733 mg/l TDS.

The standard deviation of each grouping is also illustrated in Figure 3-4. The TDS in the Phillips well is more similar to that of Subunit A than Subunit C.

Figure 3-5 shows a cross plot of sodium versus calcium for water collected from Subunit A and Subunit C. The mean ratio of Na/Ca in Subunit A is 2.2 and 0.71 in Subunit C. The Na/Ca ratio in the water collected from the Phillips well was 1.61. The sodium concentrations are generally higher in Subunit A than in Subunit C (Figure 3-5). The NA/CA ratios in water collected from the Phillips well is more similar to the ratios in water collected from Subunit A wells.

Figure 3-6 shows a comparison of the chloride and sulfate ratios of water in Subunits A and C. The ratios for Subunit A, C and the Phillips well are 0.96, 2.72 and 1.00, respectively. Although there is an overlap of the range of values between Subunits, chloride and sulfate ratios in water collected from the Phillips well is more similar to the ratios in water collected in Subunit A than to water from Subunit C.

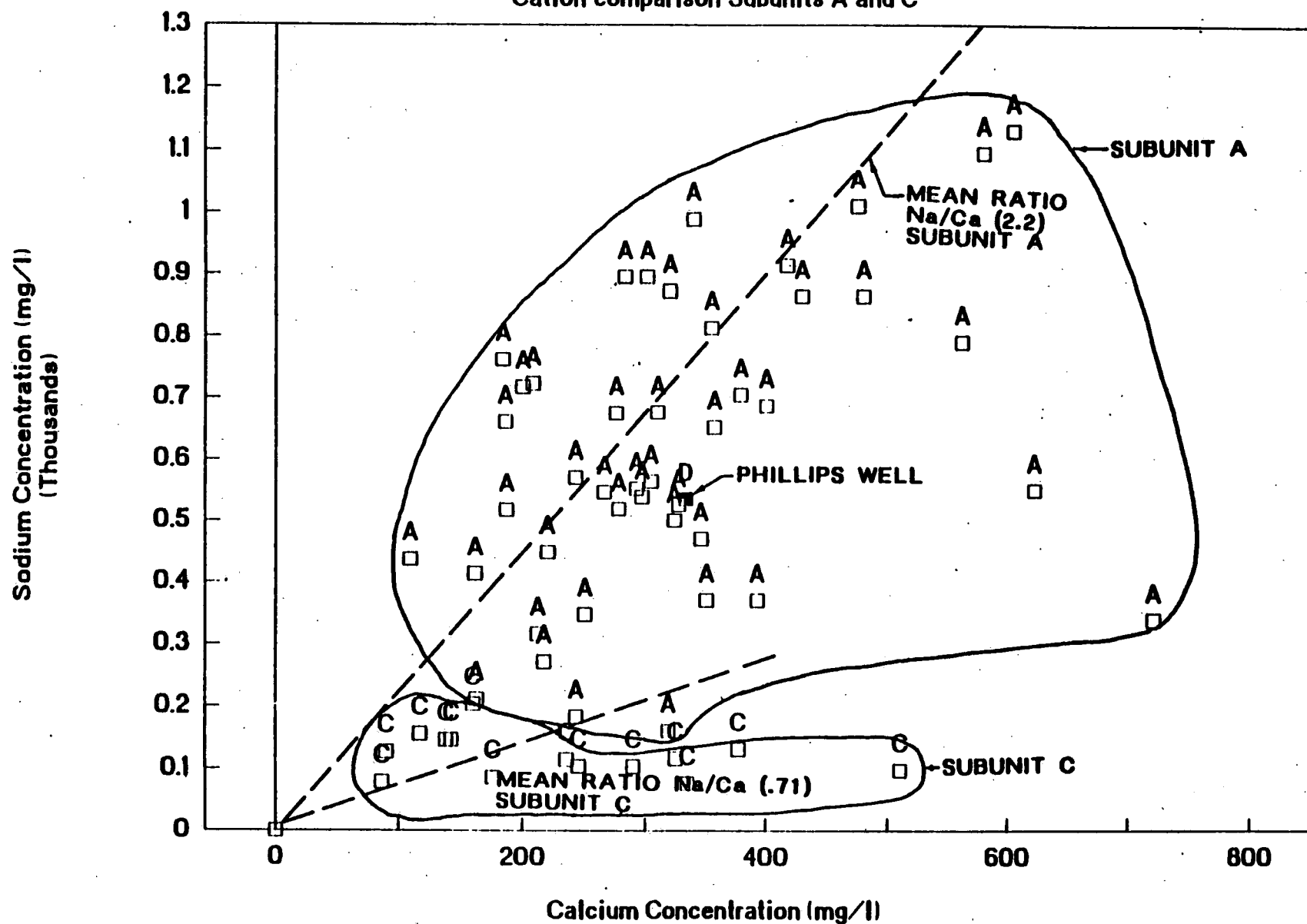
In summary, the TDS concentration in water collected from the Phillips well is greater than the average TDS concentration of water from Subunit A wells and almost 1,000 mg/l greater than water from Subunit C wells. In addition, the sodium/calcium and chloride/sulfate ratios of water from the Phillips well are within the range of calculated values for Subunit A and out of the range for Subunit C. It is clear that water collected from the Phillips well is more similar to water in Subunit A than in Subunit C. Moreover, water from the Phillips well is not representative of ground water in Subunit C. Although the Phillips well contains TCE, it is interpreted as being present not in Subunit C, but in Subunit A.

*One multi  
comp  
well  
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Phillips*



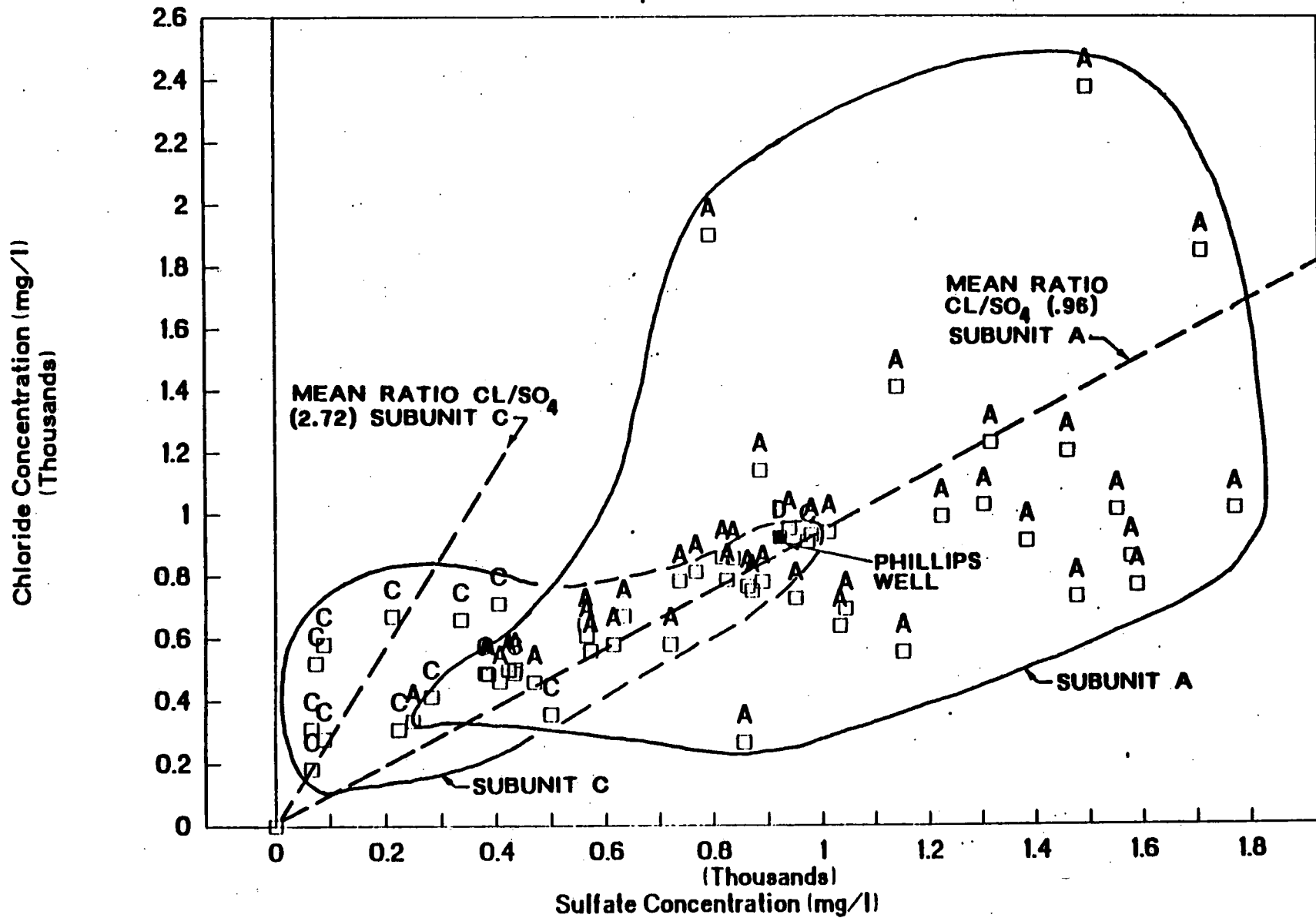
# Figure 3-5 Ground Water Chemistry

Cation comparison Subunits A and C



# Figure 3-6 Ground Water Chemistry

Anions Comparison Subunits A and C



### 3.2.4 Ground-water Flow in Subunit C

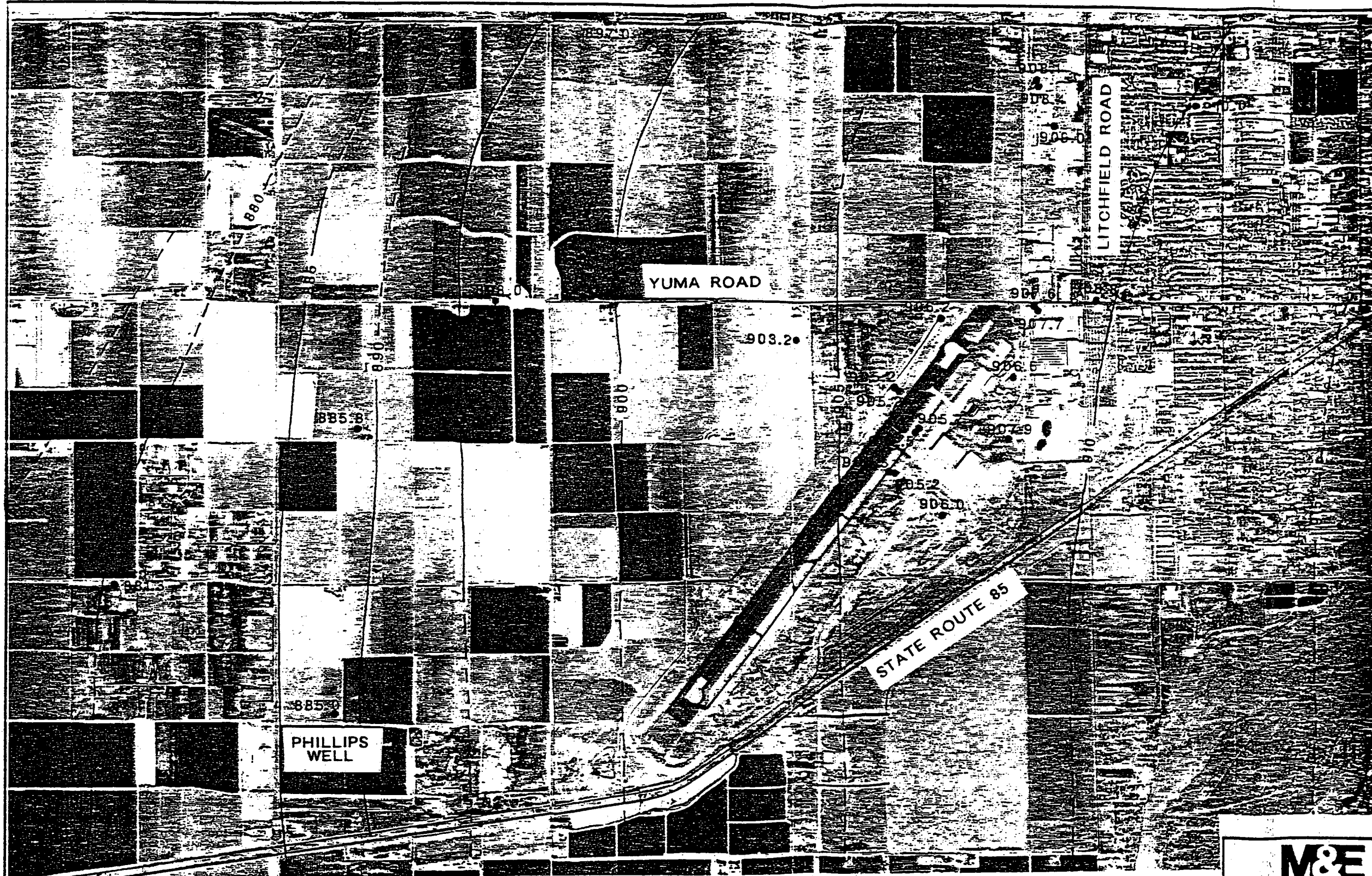
Figure 3-7 is a potentiometric map of Subunit C (based on U.S. EPA RI/FS Figure 3-31). Another, more current, potentiometric map will be constructed following field activities. The ground-water flow direction is generally to the west in Subunit C. The gradient across most of the site is approximately 0.001 ft/ft.

### 3.3 INTERPRETATIONS

Based on the data collected during the RI/FS and subsequent to the RI/FS, the interpretation of the extent of contamination differs from the interpretation presented in the U.S. EPA RI/FS. Figure 3-1 illustrates the concentrations of TCE determined in the wells screened in Subunits B and C. These data are also listed in Table 3.1. The RI/FS interpretation of the 5  $\mu\text{g/l}$  TCE plume boundary (Figure 8-4, U.S. EPA RI/FS 1989) and the current interpretation of the 5  $\mu\text{g/l}$  plume boundary are shown. As stated earlier the plume defined in the U.S. EPA RI/FS was extended uninterrupted from the facility production wells to include the Phillips Well. Current data suggests that the 5  $\mu\text{g/l}$  plume boundary of TCE is constrained around the facility production wells and does not extend to the downgradient monitoring well clusters EMW-21, EMW-28, EMW-19, and EMW-18.

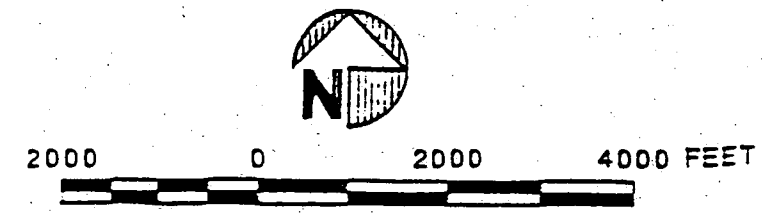
With few exceptions (16GMW-1 and -2), wells that contained concentrations above the 5  $\mu\text{g/l}$  level are water production wells and not wells installed specifically for monitoring in Subunit C. The major transport mechanism between Subunit A and Subunit C is interpreted to be through leaking production casings from inactive water wells on site. These wells should be properly abandoned to eliminate the continuing source.

TCE present in the ground water in the vicinity of the Recycled Metals #2 (RECMET 2) and Phillips wells at concentrations below 5  $\mu\text{g/l}$  is a perplexing condition. Both wells, as stated previously, yield water more like Subunit A than Subunit C. This might suggest then, that TCE present in this water is



- LEGEND**
- WELL LOCATIONS
  - LINE OF EQUAL HEAD (FEET)
  - - - LESS CERTAIN LINE OF EQUAL HEAD (FEET)

- NOTES**
1. ELEVATIONS IN FEET ABOVE SEA LEVEL
  2. CONTOUR INTERVAL-5 FEET



<b>M&amp;E</b> Metcalf & Eddy				
POTENTIOMETRIC MAP SUBUNIT C (3/88)				
SOURCE: FIGURE 3-31, U.S. EPA RI/FS, 6/89				
CHECKED	DRAWN	SCALE	PROJECT NO.	FIGURE
	BEC		6791-2-2	3-7

11/22/91

**TABLE 3.1**  
**TCE SAMPLING RESULTS SUBUNITS B AND C**  
**PHOENIX-GOODYEAR AIRPORT SITE**  
**GOODYEAR, ARIZONA**

<u>WELL</u>	<u>TCE(a)</u> <u>RANGE</u> <u>(ug/l)</u>	<u>TCE(a)</u> <u>AVERAGE</u> <u>(ug/l)</u>	<u>Dec-90</u> <u>TCE(b)</u> <u>(ug/l)</u>	<u>Jul-91</u> <u>TCE(c)</u> <u>(ug/l)</u>	<u>SOURCE OF INFORMATION(a)</u>
16GMW-1	30.6 - 41.7	34			TABLE 3-2, U.S.EPA RI/FS
16GMW-2	14.9 - 24.9	21			TABLE 3-2, U.S.EPA RI/FS
AVONSCH 2		0.7			FIGURE 8-4, U.S.EPA RI/FS
COG #1		0.5			FIGURE 8-4, U.S.EPA RI/FS
COG#11	<1.0 - 1.0	0.8			APPENDIX O, p 624 U.S.EPA RI/FS
EMW-18B	0.7 - 2.2	1.6	1.4	0.4	TABLE 3-9, U.S.EPA RI/FS
EMW-18UC	0.5 - 1.9	1.0			TABLE 3-9, U.S.EPA RI/FS
EMW-19B	ND	ND	<.2	<.2	TABLE 3-9, U.S.EPA RI/FS
EMW-19LC	0.6	0.6	<.2	<.2	TABLE 3-9, U.S.EPA RI/FS
EMW-19UC	ND	ND	<.2	<.2	TABLE 3-9, U.S.EPA RI/FS
EMW-2	8.3 - 75	33	80		TABLE 3-1, U.S.EPA RI/FS
EMW-20B1	ND	ND		<.2	TABLE 3-9, U.S.EPA RI/FS
EMW-20B2	ND	ND	<.2	<.2	TABLE 3-9, U.S.EPA RI/FS
EMW-20LC	ND	ND	<.2	<.2	TABLE 3-9, U.S.EPA RI/FS
EMW-20UC	ND	ND	<.2	<.2	TABLE 3-9, U.S.EPA RI/FS
EMW-21UC	0.6	0.6	<.2	<.2	TABLE 3-9, U.S.EPA RI/FS
EMW-22LC	ND	ND			TABLE 3-9, U.S.EPA RI/FS
EMW-28B	ND	ND	<.2	<.2	TABLE 3-9, U.S.EPA RI/FS
EMW-28LC	ND	ND	<.2	<.2	TABLE 3-9, U.S.EPA RI/FS
EMW-28UC	0.5 - 1.1	0.8	<.2	<.2	TABLE 3-9, U.S.EPA RI/FS
GAC #1	ND - 1.2	<0.5			APPENDIX O, p 599, U.S.EPA RI/FS
GAC #2	3.4 - 16	9.8	2.0	1.2	TABLE 3-5, U.S.EPA RI/FS
GAC #3	7.3 - 110	44			TABLE 3-5, U.S.EPA RI/FS
GAC #4	4.2 - 45	12			TABLE 3-5, U.S.EPA RI/FS
PARKSCH#1			<.2		
PHILLDOM		0.5			FIGURE 8-4, U.S.EPA RI/FS
PHILLIPS	9.5 - 12	10.3		4.4	TABLE 3-8, U.S.EPA RI/FS
PLA #1	NS				
PLA #2	<1 - 36	12.4			TABLE 3-6, U.S.EPA RI/FS
PLA #3NEW	220 - 310	256			TABLE 3-6, U.S.EPA RI/FS
PLA #3OLD	NS				
PLA #4	NS				
PLUMB	3.0	3.0			TABLE 3-8, U.S.EPA RI/FS
R2.9W3.3		1.0			FIGURE 8-3, U.S.EPA RI/FS
R5.6W3.5		0.3			FIGURE 8-3, U.S.EPA RI/FS
RAYNER 1		0.3			FIGURE 8-3, U.S.EPA RI/FS
RECMET2	3.6 - 6.0	4.4	3.8	2.3	TABLE 3-8, U.S.EPA RI/FS
R.WOOD 1	2.1 - 3.0	2.5			TABLE 3-8, U.S.EPA RI/FS
R.WOOD 2	<1.0 - 2.0	<1.3			TABLE 3-8, U.S.EPA RI/FS
S. SMITH	1.5 - 3.0	2.0			TABLE 3-8, U.S.EPA RI/FS

**NOTES:**

NS - not sampled or reported

ND - Sampled, but not detected

Figure 3-1 presents data tabularized above.

(a) Range and average values are from U.S.EPA RI/FS (collected 1981 - 1989).

(b) December 1990 sampling event by Bartholomew Engineering Inc.

(c) July 1991 sampling event by Bartholomew Engineering Inc.

present in Subunit A in the immediate vicinity of these wells. The presence of sources of TCE in these areas is thus suggested.

TCE concentrations below the cleanup standard have been detected in agricultural wells west of the airport in addition to the Phillips and RECMET 2 wells. The consent decree requires (Sections VII, Paragraph C.2) that if water quality in any of 20 wells identified in subparagraph C.1.9 exceed cleanup standards of contaminants listed on Table 2-5 of the 1989 ROD and is related to the PGA Superfund Site, that the defendants shall investigate to determine, upon EPA approval, if well-head treatment is required and implement well-head treatment where the U.S. EPA determines it necessary (Appendix B).

#### 4.0 PROPOSED PROGRAM

This section presents the objectives and rationale for installing additional monitoring wells to better define the extent of contamination at the site. As stated in the Consent Decree, Goodyear is required to hydraulically contain ground-water with specific organic compounds that are at concentrations above the cleanup standard. TCE is the most wide-spread contaminant and thus the 5  $\mu\text{g/l}$  isoconcentration line defines the plume boundary that must be contained. This section describes the objectives and criteria for the placement of the additional monitoring wells and the criteria for installing additional wells if the initial wells proposed do not meet the required objectives.

##### 4.1 OBJECTIVES FOR ADDITIONAL DATA GATHERING

The objective of additional data gathering is to collect information sufficient to define the extent of the plume and for design of a ground-water extraction system. The plume boundary is defined as the bracketed area between ground-water concentrations greater than and less than the 5  $\mu\text{g/l}$  isoconcentration line. To define this plume boundary around the facility production wells, four monitoring well locations have been chosen and are described below. To accurately assess the vertical distribution of contaminants, more than one stratigraphic interval within Subunit C will be screened.

##### 4.2 RATIONALE AND CRITERIA FOR PLACEMENT OF NEW MONITORING WELLS

Current ground-water data constrains the 5  $\mu\text{g/l}$  isoconcentration line between facility production wells which contain TCE concentrations above 5  $\mu\text{g/l}$  and downgradient monitoring wells that contain the concentrations below 5  $\mu\text{g/l}$ . The distance between these points, however, is over 1,800 feet in places. This distance is considered too great to assess the TCE-contaminated ground-water plume. Thus, four multiple screened monitoring wells will be installed downgradient of the facility production wells. Generally, it is believed that as contaminants (in this case TCE) travel from the source, they will disperse resulting in a decrease in concentration. It is unlikely, however, that this

decrease will be linear between the source and some point downgradient. If data were available between these two points, an estimate could be made as to where a specific concentration might be expected. That concentration, in this case, is 5  $\mu\text{g/l}$ .

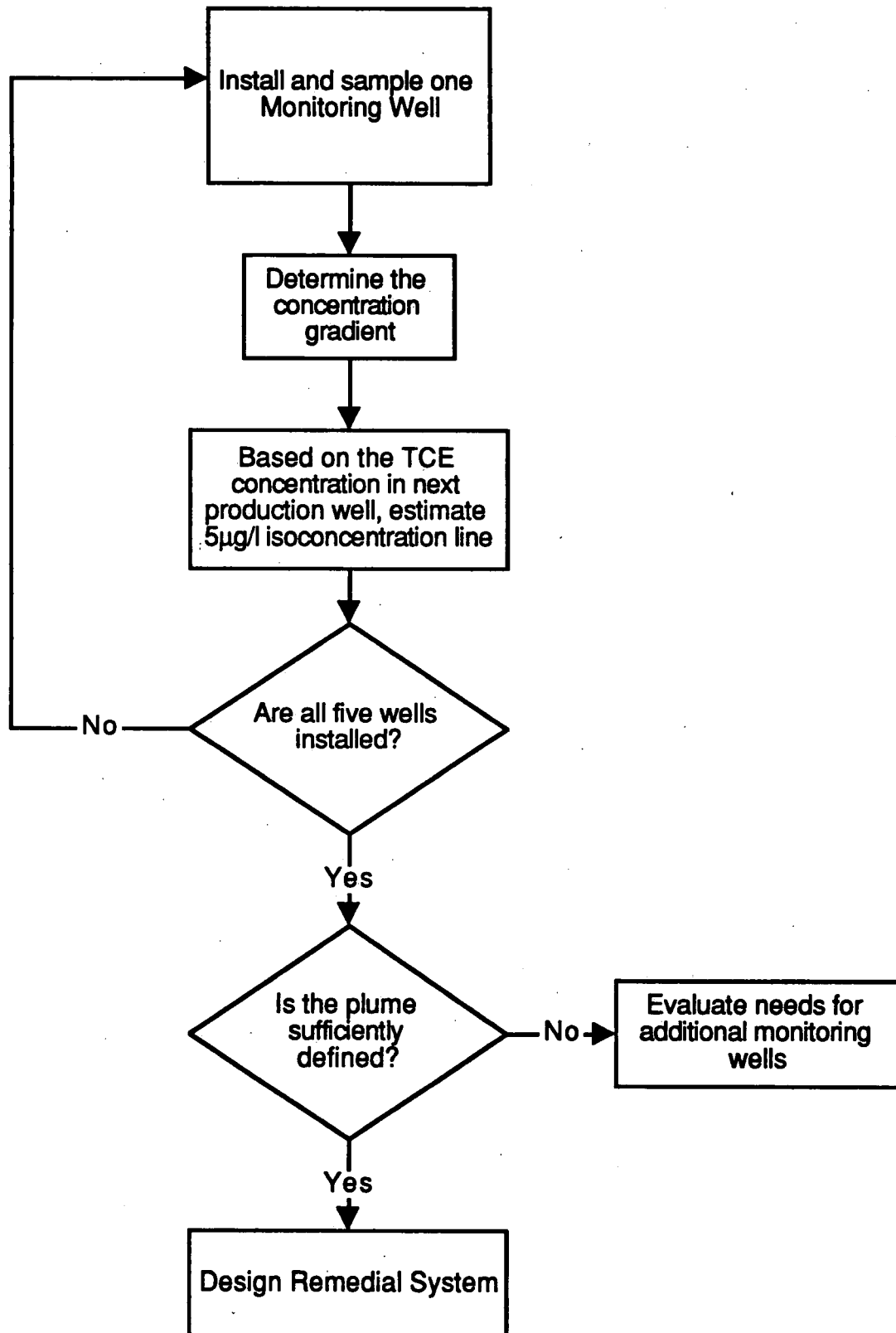
Given this explanation, the first of the four monitoring wells (GMW-11) will be installed 500 feet downgradient of the production well with the highest TCE concentration (PLA#3New). Ground water will be collected and analyzed from this first well prior to mobilizing to the next well location. Based on the results of the chemical analysis of water collected from this first well, an estimate will be made of the concentration gradient between the production well and the existing monitoring wells. It will be assumed that the concentration gradient is similar downgradient of the remaining production wells and the next monitoring well location will be chosen downgradient of the next production well to try to intercept the 5  $\mu\text{g/l}$  isoconcentration line. The concentration in each production well will be used to estimate the location of the 5  $\mu\text{g/l}$  isoconcentration. The goal is to have monitoring wells located as close to the 5  $\mu\text{g/l}$  concentration as possible. The closer the 5  $\mu\text{g/l}$  concentration can be defined, the more accurate an extraction system can be designed to capture the contaminants. This method of estimating the location of the extraction wells will continue until all four wells are installed (Figure 4-1).

After all four of these monitoring wells are installed, the data will be reviewed to determine if the plume has been sufficiently defined around the facility production wells. The more precisely the 5  $\mu\text{g/l}$  plume boundary can be defined, the more precision there will be in the extraction system design. Additional wells may be required to sufficiently define the plume and will be addressed after the four monitoring wells are installed.

The first four wells include multiple screened intervals to evaluate the vertical distribution of TCE. If, following installation of the four monitoring wells, additional wells are required, then the need for multiple screened intervals will be evaluated.



**Figure 4-1**  
**Strategy for Determining Monitoring Well Placement**



The locations of monitoring wells proposed in this plan may be modified due to access restrictions.

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#### 4.3 PROPOSED MONITORING WELL NETWORK

Table 4.1 shows the monitoring well network existing and proposed for Subunit C and the potential sources (facility production wells). Each of these sources and rationale for selecting monitoring well depths and sampling intervals are described below.

Figure 4-2 shows the location of existing facility production wells and the present monitoring wells downgradient from these wells. Cross sections A-A' through F-F' are shown in Figure 4-3 and 4-4 (Map Pocket). Figure 4-5 shows the five multiscreened monitoring wells described below. Note that the locations for these monitoring wells will be modified to accommodate the results of the concentration gradient estimates previously described.

##### 4.3.1 GAC #3

Goodyear Aerospace Corporation well GAC #3 (Figure 4-2) was constructed in 1942 of 20-inch-diameter steel casing from 0 to 320 feet below land surface. The steel casing was backfilled to 296 feet and perforated from 194 to 206 feet, 224 to 238 feet, and 280 to 296 feet (Figure 4-4). All perforations are in Subunit C. TCE was detected in this well at 120  $\mu\text{g/l}$ .

A casing leak was detected at 175 feet, within Subunit B, through which flow into the well bore is actively occurring. It is believed that contaminated ground water has migrated downward to Subunit C, both along the outside of the casing and through leaks in the casing. To adequately monitor these migration pathways, additional monitoring points will be installed downgradient of this well in Subunit C.

The present downgradient monitoring well nearest GAC #3 is 16GMW-1, located less than 400 feet to the west (Figure 4-2). Monitoring well 16GMW-1 is screened from 270 to 300 feet below grade to detect contaminated ground water

**TABLE 4.1**  
**MONITORING WELL NETWORK**  
**EXISTING AND PROPOSED**

Potential Source	Existing Monitoring Well Network	Proposed Monitoring Well Network
GAC #3	16GMW-1, 16GMW-2 EMW-21UC	<u>GMW-9 MC</u>
GAC #4	EMW-20B1, EMW-20B2 EMW-20UC, EMW-20LC	<u>GMW-10UC/LC</u>
PLA #1/PLA #2	EMW-28B, EMW-28UC EMW-28LC	<u>GMW-12</u>
PLA #3 OLD/PLA #3 NEW	EMW-28B, EMW-28UC	<u>GMW-11UC/LC</u>

Note: Proposed monitoring wells are underlined

Definition of Terms:

- UC - Upper part of Subunit C
- MC - Middle part of Subunit C
- LC - Lower part of Subunit C

originating from the lowest well screen in GAC #3 (Figure 4-4). Another monitoring well, 16GMW-2 located 425 west of GAC #3 is screened from 160 to 190 feet. GAC #3 is not adequately monitored by these two monitoring wells. Another monitoring well, GMW-9MC (Figures 4-3 and 4-5), screened from 200 to 240 feet is designed to more completely assess this potential source.

#### 4.3.2 GAC #2

Goodyear Aerospace Corporation Well GAC #2 (Figure 4-3) is constructed of 20-inch diameter steel casing from 0 to 330 feet below land surface. The casing is perforated from 195 to 224 and 250 to 280 feet. TCE was detected in this well at concentrations ranging from 2 to 16  $\mu\text{g/l}$ . The July 1991 sample detected TCE at 1.2  $\mu\text{g/l}$ . This well is the active water supply well for the Loral Facility.

Casing leaks were detected at 112 feet and 238 feet below land surface. The casing leak at 112 feet is within Subunit B and may be an important conduit in the movement of contaminated water from Subunit A to Subunit C. The casing leak at 238 feet is within Subunit C, between perforation intervals and is of little significance. Potential contaminant migration paths for this well also include downward migration along the outside of the unsealed well casing from Subunit A to C.

Because the TCE concentration in this well below 5  $\mu\text{g/l}$ , monitoring is not necessary downgradient of this well.

#### 4.3.3 GAC #4

Goodyear Aerospace Corporation well GAC #4 (Figures 4-2 and 4-3) was constructed with 20-inch-diameter steel casing from 0 to 302 feet below land surface, perforated from 170 to 180 feet and from 257 to 275 feet. The bottom of the well was plugged with cement from 275 to 302 feet. TCE was detected in this well at 120  $\mu\text{g/l}$ .

A casing leak was detected at 110 feet depth within Subunit A (Figure 4-3). This well is of particular concern, as it is located within the area having the highest concentration of TCE in Subunit A. Contaminant transport pathways for this well include migration along the borehole outside of the casing from Subunit A to Subunit C, and flow into the well through the casing leak, which would allow contaminants to flow down the well bore and enter Subunit C through the perforated casing.

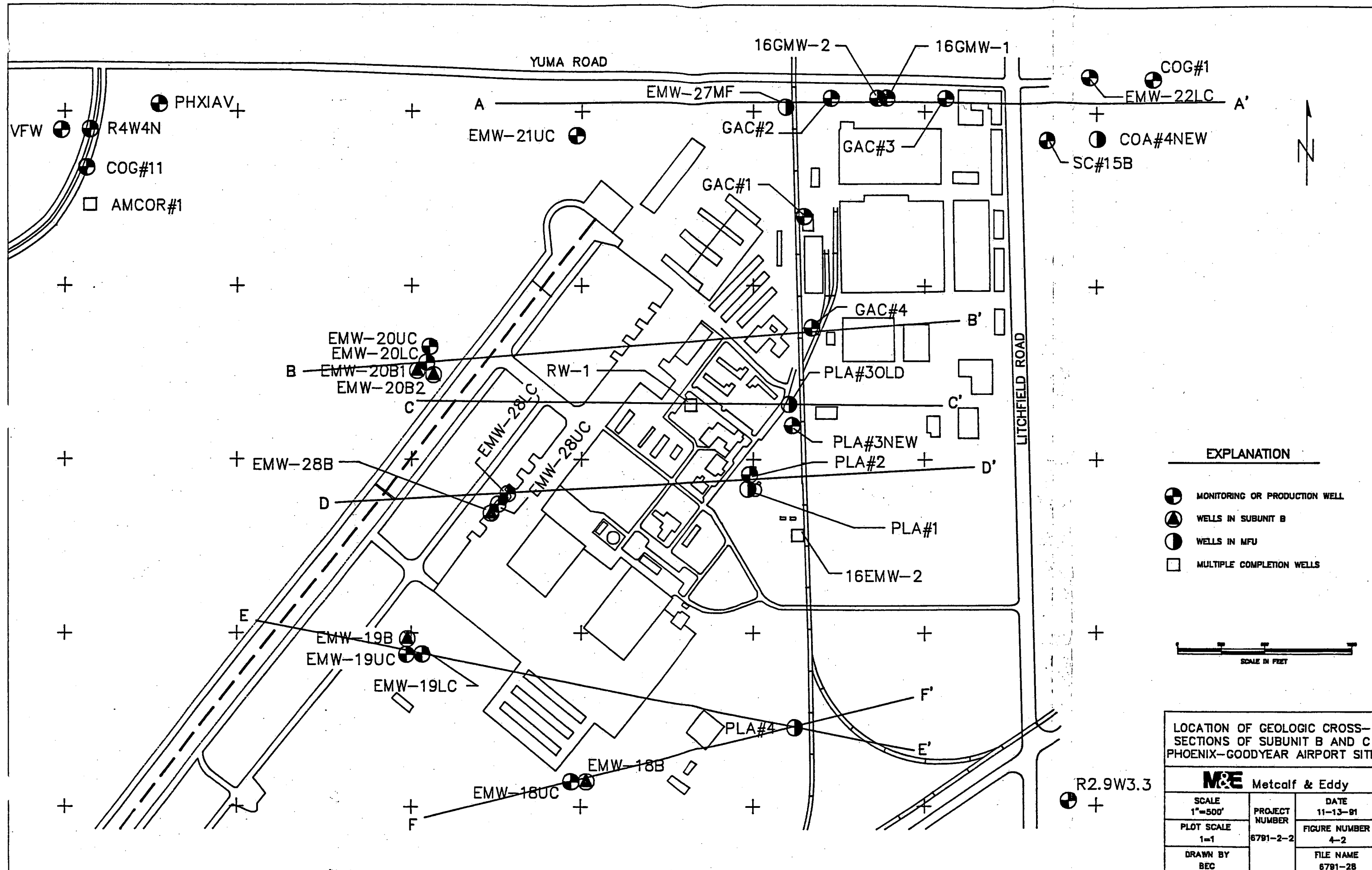
The nearest downgradient monitoring-well cluster is EMW-20, located about 2,200 feet west of GAC #4 (Figure 4-2). Monitoring well EMW-20B1 is screened from 150 to 200 feet below grade, EMW-20B2 from 134 to 159 feet below grade, EMW-20UC from 175 to 230 feet below grade, and EMW-16LC from 250 to 300 feet below grade (Figure 4-3). This monitoring well cluster provides good depth coverage for all migration pathways from GAC #4, but it may be too far from GAC #4 to yield conclusive results. A monitoring well is required about 800 feet west of GAC #4 (Figure 4-3) screened from 200 to 225 feet and from 235 to 305 feet (GMW-10UC/LC) below land surface. These additional monitoring points should be sufficient to detect contaminated ground-water migrating from perforations in GAC #4 and any leakage along the well casing.

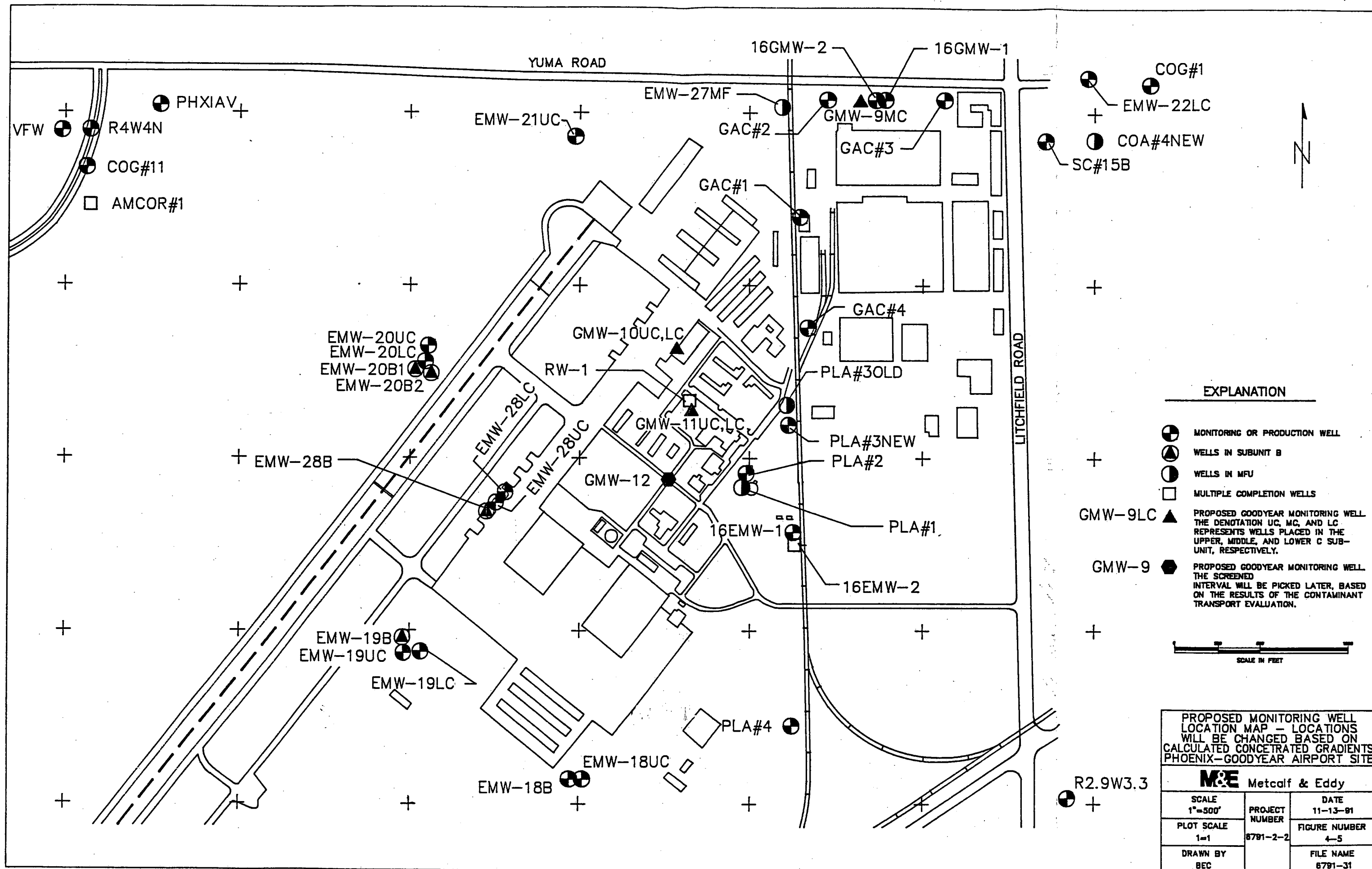
#### 4.3.4 PLA #3 Old

The Phoenix-Litchfield Airport Well PLA #3 Old (Figure 4-2) was constructed of 20-inch diameter steel casing to 1,800 feet below grade. No driller's log is available. Reportedly the casing is perforated from 1,200 to 1,800 feet below grade. No sampling data for this well are available.

This production well has not been geophysically logged or tested for casing leaks. Testing has been proposed however, to determine whether this well should be abandoned (Metcalf & Eddy, Inc., 1991). It is possible that contaminated ground-water may have migrated along the exterior of the casing from Subunit A to Subunit C.

The downgradient monitoring-well cluster nearest PLA #3 Old is EMW-28, about 1,800 feet west-southwest (Figure 4-2). Well EMW-28B is screened from 127 to





147 feet below land surface. EMW-28UC is screened from 171 to 221 feet, and EMW-28LC is screened from 247 to 297 feet below land surface (Figure 4-3). Although the well screen for EMW-28UC is appropriately placed to detect migration of contaminants along the outside of the casing of PLA #3, this well cluster may be too far from PLA #3 Old to give definitive results. Accordingly, one well will be installed about 600 feet west of PLA #3 Old (GMW-11UC) and screened in the upper portion of Subunit C (Figures 4-3 and 4-5). Until tests of casing integrity are made, additional recommendations for multiple well-screen placement cannot be made.

#### 4.3.5 PLA #3 New

Phoenix-Litchfield Airport production well PLA #3 New (Figure 4-2) is constructed of 20-inch diameter steel casing from 0 to 500 feet below land surface. The casing was perforated from 170 to 205 feet and 250 to 300 feet below land surface. The lower part of the casing was cemented from 394 to 500 feet (Figure 4-3). TCE was detected in this well at 310  $\mu\text{g/l}$ .

Casing leaks were detected at 115 and 134 feet below ground surface, within Subunit B. Possible pathways of migration of contaminants emanating from this well include movement along the outside of the well casing from Subunit A to Subunit C, and into the well casing through the casing leaks in Subunit B, with discharge through the perforated intervals into Subunit C.

Vertical screen placement in monitoring well cluster EMW-28, 1800 feet downgradient of PLA #3 New, is considered adequate for detection of discharge from both the upper and lower perforated intervals in PLA #3 New (Figures 4-2 and 4-3). However, this monitoring well cluster may be too far from the production well to yield conclusive data. Therefore, a multiscreen monitoring well, GMW-11, will be installed about 500 feet west of PLA #3 New with screened intervals similar to those in EMW-28 (180 to 220 feet and 265 to 305 feet) (Figures 4-3 and 4-5).



#### 4.3.6 PLA #1 and PLA #2

Phoenix-Litchfield Airport well PLA #1 (Figure 4-2) was constructed of 30-inch-diameter steel casing to 500 feet. A 16-inch diameter inner casing was placed from the surface to 516 feet, and a 12-inch diameter casing hung from 516 to 1,800 feet (Figure 4-4). This well has not been geophysically logged nor evaluated for casing integrity. No sampling data are available for this well.

Well PLA #2 (Figure 4-3) was constructed to a total depth of 240 feet but construction details are not known (Figure 4-4). No geophysical logging has been done nor any evaluation of casing integrity. TCE was detected at 290  $\mu\text{g/l}$  in this well.

Both PLA #1 and PLA #2 are suspected conduits for contaminant migration from Subunit A to Subunit C along the outside of the well casings. Monitoring well cluster EMW-28 is located 1,400 feet downgradient of PLA #1 and PLA #2 (Figure 4-2). The screened intervals for EMW-28UC and EMW-28LC (180 to 220 feet and 265 to 305 feet, respectively) are appropriately placed to detect contaminants that may have migrated along the outside of the casings of PLA #1 or PLA #2 (Figure 4-4). Assuming that PLA #2 is perforated at the bottom 20 feet of the well, EMW-28LC is screened appropriately for contaminants that may have migrated through leaks in the casing from Subunit A to the screen of PLA #2. However, the distance to EMW-28 may be too great for conclusive results.

Until diagnostic/geophysical testing is complete, screened intervals cannot be selected, but will include, at least, a screen in the upper part of Subunit C. Proposed multiscreened well GMW-12, about 450 feet downgradient, will be screened to provide adequate coverage of all suspected migration pathways, and will include screens in the upper part of Subunit C.

#### 4.3.7 PLA #4

Phoenix-Litchfield Airport well PLA #4 (Figure 4-2) was constructed of 30-inch-diameter outer casing from 0 to 500 feet, 16-inch-diameter inner casing

also to 500 feet, and 12-inch-diameter casing from 500 feet to 1,500 feet. The perforated interval is from 1000 to 1500 feet (Figure 4-4). TCE was not detected in this well. Diagnostic/geophysical logging conducted in February 1992 did not indicate a casing leak in this well and TCE was not detected in the sample collected from this well (M&E, March 12, 1992). The well was included in the original analysis for completeness.

Based on the analysis to date, this well does not represent a source of contamination in Subunit C and therefore does not require the monitoring well downgradient proposed in an earlier version of this plan (prior to the diagnostic logging conducted in February 1992).

## **5.0 THE DESIGN OF THE GROUND-WATER EXTRACTION SYSTEM-SUBUNITS B AND C**

### **5.1 OBJECTIVES AND APPROACHES TO REMEDIATION**

The primary data requirements for the design of a ground-water extraction system include defining the extent of contamination, and better defining the hydrogeology of the site. The following section describes the current understanding of these parameters and the proposed approach for determining extraction well placement and estimated pumping rates.

The objectives of the ground-water extraction system design are:

- To provide hydraulic control of ground water in Subunit C that contains in excess of  $5 \mu\text{g/l}$  TCE;
- To design the extraction system such that minimal recharge of Subunit C is induced infiltration from Subunit A.

### **5.2 DATA REQUIREMENTS FOR EXTRACTION SYSTEM DESIGN**

#### **5.2.1 Nature Of Contaminants**

The nature of contamination at the PGA Superfund Site has been defined. The extraction system will be designed to extract ground water that is contaminated with TCE above a concentration of  $5 \mu\text{g/l}$ .

#### **5.2.2 Extent Of Contamination**

The extent of TCE-contamination in Subunits B and C has not been defined. Currently, TCE has been detected above  $5 \mu\text{g/l}$  only in facility production wells in the northeast part of the airport. The location and depths of five additional monitoring-well clusters to better define the contaminant plume in the vicinity of facility production wells have been described. A review of current data leads to the conclusion that Subunits B and C are contaminated above  $5 \mu\text{g/l}$  only in the immediate vicinity of the facility production wells.

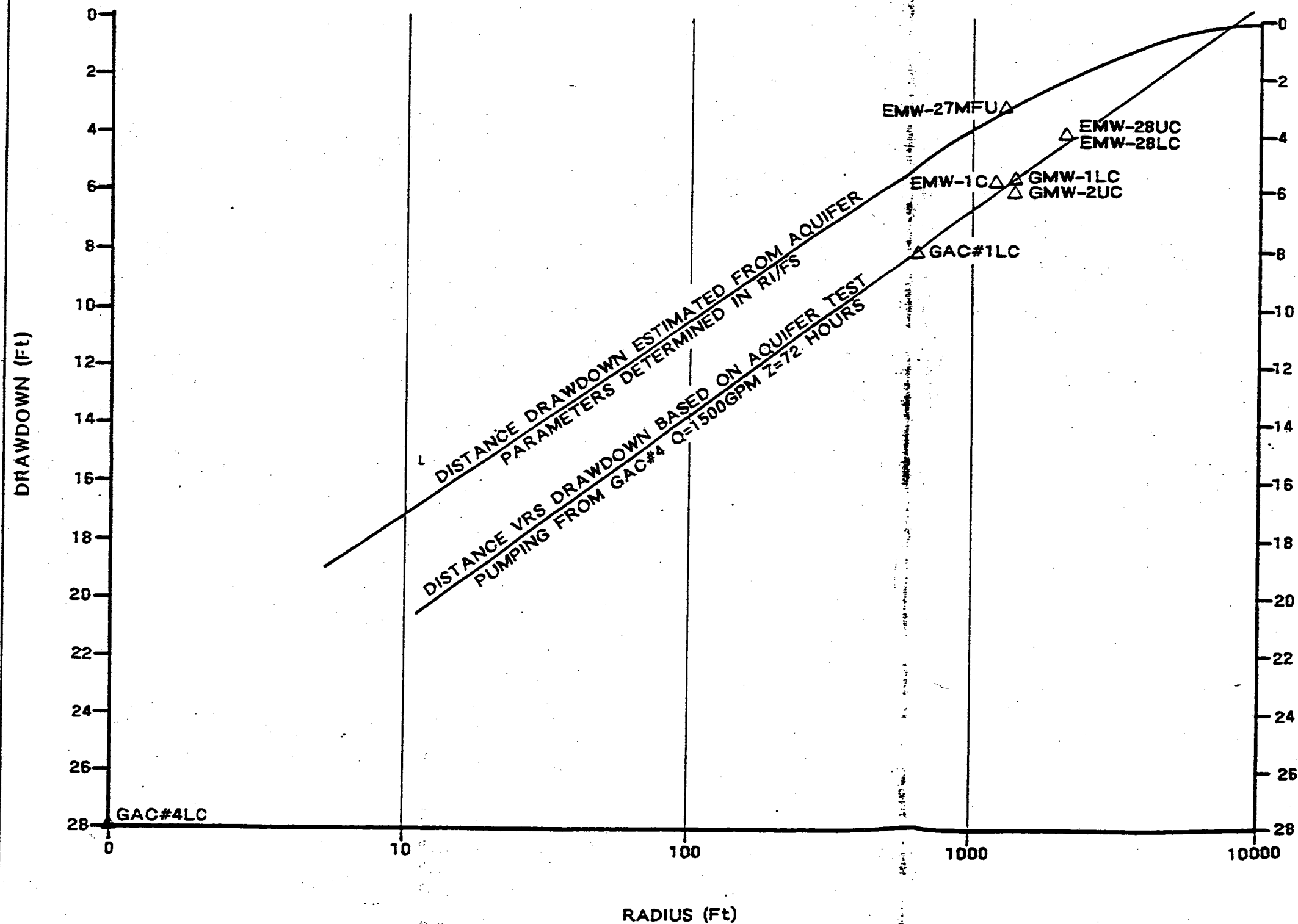
### 5.2.3 Geologic Data

Prediction of the effectiveness of an extraction system requires an understanding of the hydrologic character and areal extent of the lithologic units involved. In the northeast part of the airport facility, the stratigraphy is fairly well understood, with more than thirty wells in the vicinity of the facility production wells having been drilled into Subunits B and C. Driller's logs are available for all of the facility production wells except PLA #1, PLA #2, and PLA #4. Geophysical/diagnostic logging has been proposed for these wells. The potential pathways for migration of contaminants into Subunit C have been described in Section 3 of this Plan, except for wells PLA #1, #2, #3 OLD, and #4. Geophysical logging should provide geologic data and information on potential pathways for these wells.

### 5.2.4 Hydrogeologic Data

The design of an effective extraction system for Subunit C will require hydrogeologic data over most of the area of contamination. Specifically, aquifer properties of Subunit C must be better known, and the hydraulic interaction between Subunits A, B, and C in response to pumping in Subunit C must be determined. Generally, such data are collected by aquifer tests made in one or more pumping wells.

Hydrogeologic data have been collected near the facility production wells. An aquifer test was conducted by pumping GAC #4 for 72 hours on January 25, 1988 at 1500 GPM and observing the response in 12 observation wells (U.S. EPA, June 1989, RI/FS Appendix O, Volume IV). Results of the test are considered sufficient to characterize the aquifer in the area of the facility production wells. A drawdown-versus-distance plot after 72 hours is shown in Figure 5-1. For comparison, the average aquifer properties presented in the RI/FS are also used to calculate a distance-drawdown curve for an extraction well pumping the same rate. Measured drawdown was greater than calculated values by about two feet, for distances of over 5000 feet from the pumped well. The average



CALCULATIONS BASED ON  
HANTUSH & JACOB, 1955

$$S = \frac{114.5 Q}{T} W(u, r/B)$$

$$u = \frac{1.87 r^2 S}{T t}$$

$$T = 120,000 \text{ CPD/Ft}$$

$$S = 0.0001$$

$$B = 3464.1 \text{ Ft}$$

$$Q = 1500 \text{ GPM}$$

$$t = 365 \text{ DAYS}$$

**M&E**

Metcalf & Eddy

COMPARISON BETWEEN DISTANCE DRAWDOWN  
CURVE OF GAC #4 PUMPING TEST AND  
PREDICTED DISTANCE-DRAWDOWN CURVE  
USING RI/FS DETERMINED PARAMETERS AND  
HANTUSH & JACOB METHOD.

CHECKED	DRAWN	SCALE	PROJECT No.	FIGURE
MR	JWK	NONE	6791-0002	5-1

aquifer properties as presented in the RI/FS report are considered adequate for providing preliminary predictions of performance of an extraction system.

Additional analysis of the 72-hour pumping test in GAC #4 will be conducted with a focus on the interaction between Subunit A and C. The analysis will determine the amount of head difference between Subunits A and C that will cause infiltration through Subunit B. The maximum head difference the system can sustain before causing infiltration is critical to the design of the Subunit C extraction system.

### 5.3 DESIGN OF THE EXTRACTION SYSTEM

Figure 5-2 illustrates the general logic and approach to design of the ground-water extraction system. The first step in the process is to collect water level and pumping data in Subunits A, B and C. This data will be used to update the potentiometric maps and to be incorporated into the ground-water model.

Based on the currently interpreted ground-water plume boundary, initial simulations will be run to determine extraction rates and locations of the extraction wells. Re-injection of treated water will be considered as a potential end-use scenario. Re-injection will be proposed if determined more cost effective and more easily implemented than other end use options.

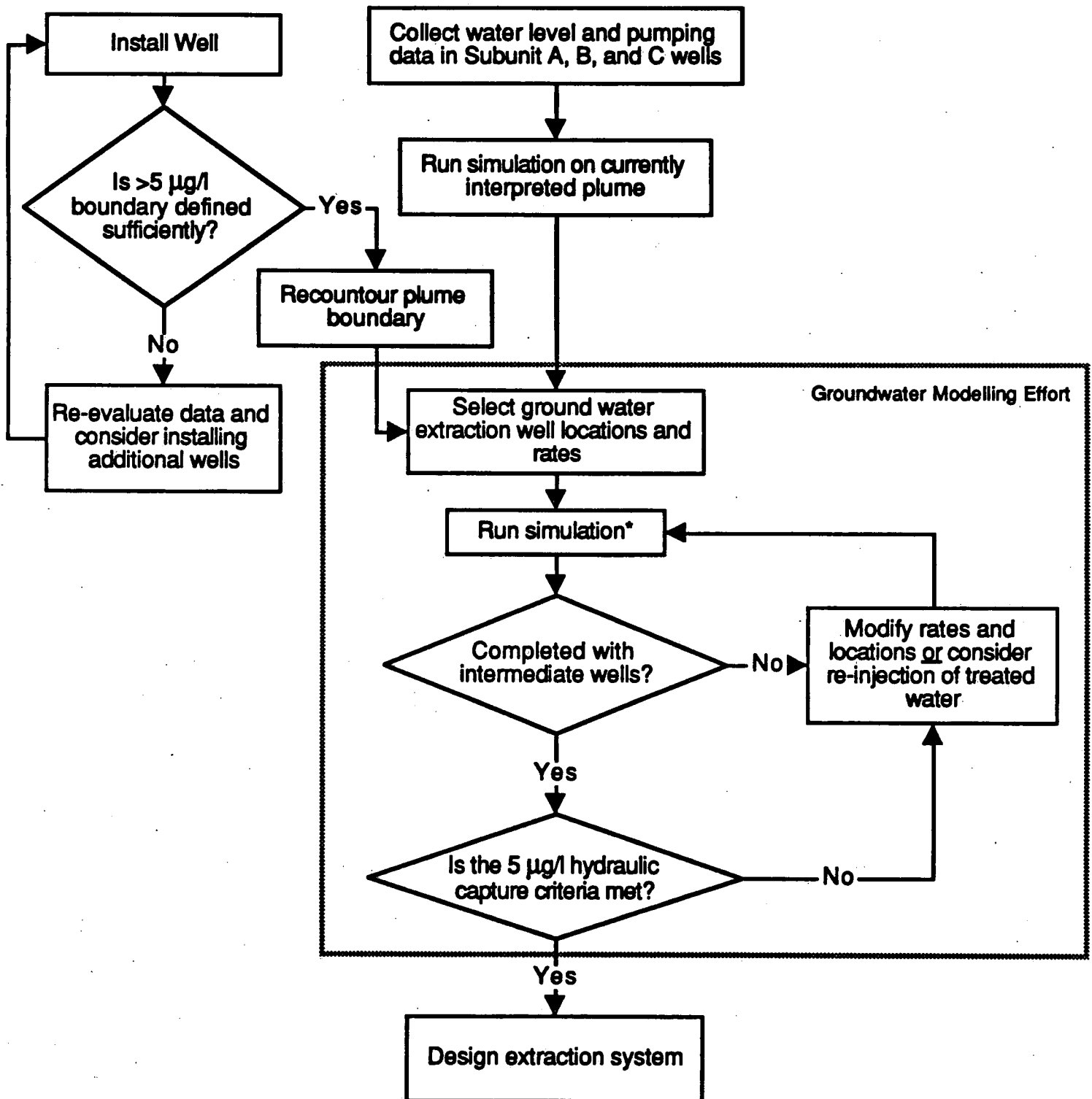
Following work plan approval, the six proposed additional monitoring wells will be installed to refine the TCE plume boundary. The updated plume boundary will be incorporated into the modelling simulation and the flow rates and locations adjusted to meet the design criteria. The predicted aquifer response to pumping using radial flow equations will be compared to the MODFLOW simulations.

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#### 5.3.1 Design Criteria for Infiltration from Subunit A

The highest concentration in Subunit A is approximately 10 times that of Subunit C. For a beneficial cleanup of Subunit C, the infiltration from

**Figure 5-2  
Groundwater Extraction System Design Logic**



\* Simulations will be checked with a mathematical computation using the radial flow equations.

Subunit A must be minimized. If 10 percent of the recharge came through Subunit B and diluted to 10 percent of its concentration, the total mass of TCE removed would be equal to the mass of TCE entering through Subunit B. Infiltration then must be less than 10 percent to effect a beneficial cleanup. To add a margin of safety, five percent infiltration from Subunit A is considered the maximum tolerable rate for cleanup of Subunit C.

For system design, the rate of infiltration from Subunit A will be simulated with the currently developed MODFLOW model. Model sensitivities will be run to determine uncertainties in vertical conductivity through Subunit B. If the goal of less than five percent infiltration cannot be obtained with the configuration of extraction wells in Subunit C, re-injection of the treated ground-water will be considered to control the head distribution.

#### **5.3.2 Design Criteria for Hydraulic Capture**

As stated in the design objectives, the ground-water extraction system will be required to provide hydraulic capture of the 5  $\mu\text{g/l}$  TCE plume boundaries. The extraction system currently operating in Subunit A is in the vicinity of the area of contamination in Subunit C. The MODFLOW model will be used to determine the rate of extraction from Subunit C so as not to negate the beneficial effect of the contribution of the flow of water from Subunit B into Subunit A extraction wells.



## 6.0 FIELD METHODS FOR GROUND-WATER MONITORING WELLS

All monitoring wells installed during the planned field work will be multi-level ground-water monitoring wells, such as Westbay's MP-System, installed inside 4-inch diameter 304 stainless steel casing. The purpose for choosing this method is to provide multiple sampling levels within Subunit C (as described in Section 4); minimize the solid and liquid waste generated during the installation, development, and purging process, and maintain a cost-effective approach to this investigation. Figure 6-1 shows a typical monitoring well construction diagram.

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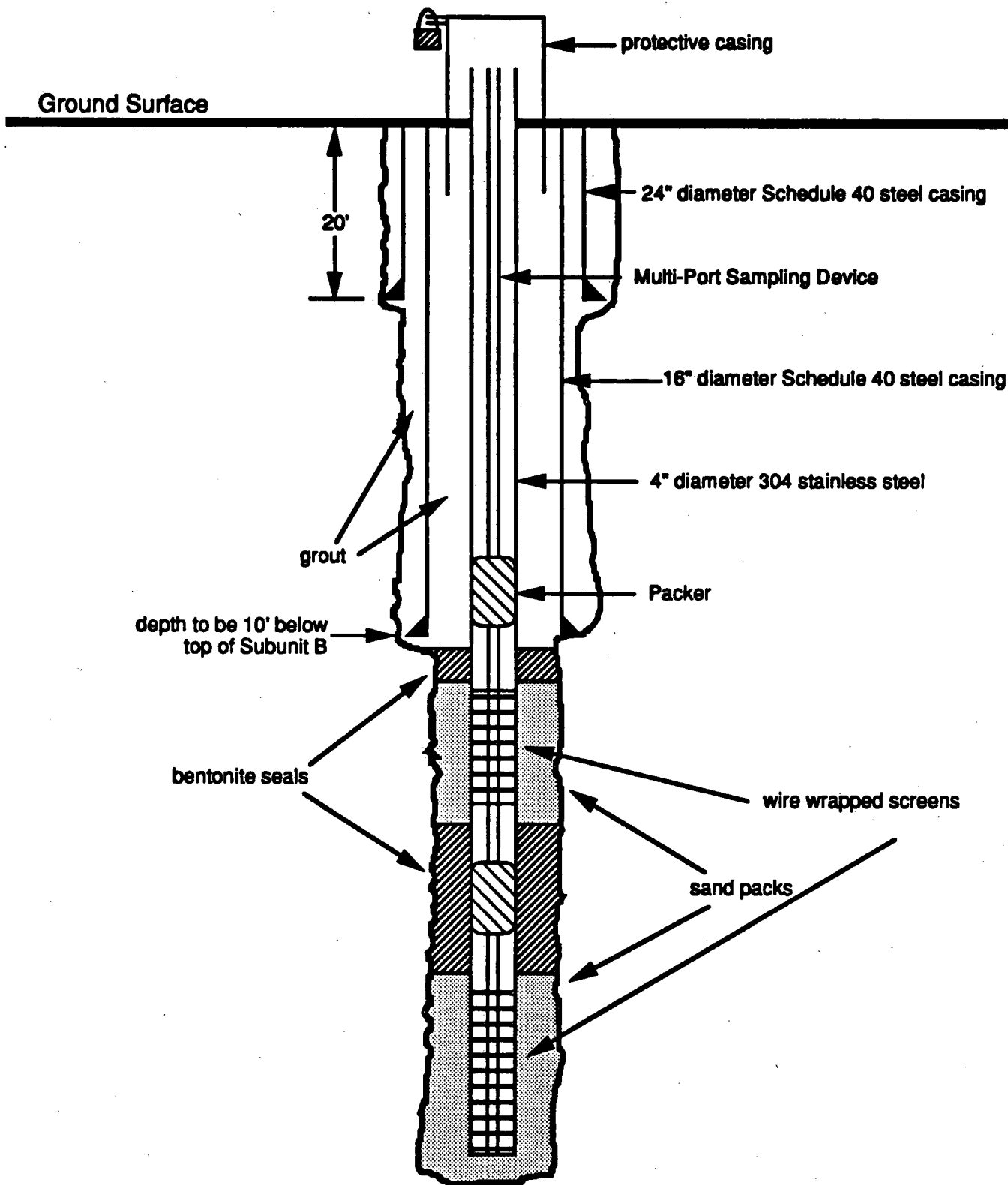
### 6.1 SURFACE CASING

The surface casing will be installed by drilling a 30-inch diameter hole to a minimum depth of 20 feet and then installing a 24-inch diameter Schedule 40 steel casing. The annular space will be filled with cement to provide a sanitary seal and prevent surface water from infiltrating into the well. This surface casing will extend above the land surface a minimum of 1 foot until completion of the well. Where installations are completed below grade, the casing will be cut at the base elevation of the vault.

### 6.2 MONITORING WELL DRILLING AND INSTALLATION

After the surface casing has been installed, a 20-inch diameter hole will be drilled, using reverse mud rotary techniques, to the base of Subunit A and into Subunit B about 10 feet. A 16-inch diameter steel casing will be installed and cemented in place to insure that Subunit A is isolated from Subunit C. A 10-inch diameter bore hole will then be advanced to the target depth for the well. A 4-inch diameter 304 stainless steel well will be constructed by placing stainless steel screens at the depths specified in Section 3 for each well, with blank stainless steel casing between the screened intervals.

Around the 4-inch casing a graded sand pack will be placed extending three feet above and three feet below each screened interval. The sand packs will



be separated by bentonite and sand (1:1) seals a minimum of 5 feet thick. Careful placement of sand packs and seals will be assured by frequent soundings and placement by tremie pipes.

After completion of each well installation, the well will be developed after first swabbing the casing. Each screened interval will be developed separately using straddle packers and submersible pumps and will be continued until all drilling fluid and clay pack are removed, and water is obtained free and clear of suspended sediment.

### **6.3 MULTI-LEVEL SAMPLING SYSTEM INSTALLATION AND WELL DEVELOPMENT**

The multi-level sampling system casing will then be installed inside the 4-inch casing and packers will be inflated above and below each well screen. Well construction will use stainless steel casing and couplings throughout the system. The temperature and pressure conditions for this installation are expected to be compatible with this material.

After installation of the multi-level sampling system, each screened interval will be purged a minimum of 10 volumes. This is required to minimize the possibility of having water from other zones mixed with the particular screened interval. Purging will continue until pH, specific conductance, and water temperature have stabilized.

### **6.4 WASTE MANAGEMENT**

#### **6.4.1 SOIL CUTTINGS**

All drill cuttings will be containerized and sampled to determine the appropriate disposal method. All cuttings from separate Subunits will be kept separate to minimize the amount of soil that may need to be disposed offsite. If soils do not need to be disposed off-site, they will be spread over the area around the boring from which they came. Goodyear will provide U.S. EPA with sampling results and a recommended disposal method prior to implementation of disposal.

#### **6.4.2 DEVELOPMENT AND PURGING WATER**

During development and purging, all water will be contained and stored in secure tanks adjacent to the treatment plant. Water will be disposed of by treating through the existing air-stripping tower.

## 7.0 SAMPLING AND ANALYSIS

The objective of sampling and analyzing ground water collected from the newly installed monitoring wells is to collect a ground-water sample representative of the water present in the aquifer in the zone of sampling and determine the concentration of contaminants within those zones. Samples will be collected in accordance with the revised Sampling and Analysis Plan originally written by ICF and Bartholomew Engineering, June 10, 1991.

Prior to sampling, the multi-port monitoring wells, Goodyear will submit for approval a technical memorandum describing the techniques for sampling the multi-port wells. This technical memorandum will be incorporated into the overall Site sampling and Analysis Plan.

## 8.0 SCHEDULE

The following is an estimated schedule for implementation of this Field Investigation Work Plan.

Task Description	Start Date*	Completion Date
• Subcontractor Selection	0	30
• Obtain Drilling Permits and Easements	0	45
• Install Monitoring Wells	45	105
• Draft 30% Conceptual Design Report	75	180

\* Start date is based on approval of this Field Investigation Work Plan.

## 9.0 REFERENCES

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**APPENDIX A**  
**HEALTH AND SAFETY PLAN**



**METCALF & EDDY, INC.**

**HEALTH & SAFETY PLAN  
FOR FIELD WORK ASSOCIATED WITH  
SUBUNITS B AND C REMEDIATION**

**Prepared for:**

**THE GOODYEAR TIRE & RUBBER COMPANY  
1144 EAST MARKET STREET  
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**August 26, 1991**

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## **GLOSSARY**

<b>ANSI</b>	- American National Standards Institute
<b>APR</b>	- Air Purifying Respirator
<b>ACGIH</b>	- American Conference Of Governmental Industrial Hygienists
<b>CFR</b>	- Code Of Federal Regulations
<b>CGI</b>	- Combustible Gas Indicator
<b>CLEAN ZONE</b>	- Support Zone
<b>CSEP</b>	- Confined Space Entry Permit
<b>DECON</b>	- Decontamination
<b>ERCS</b>	- Emergency Response Clean-up Services
<b>ERT</b>	- Emergency Response Team
<b>HNU-PID</b>	- HNu Photoionization Detector
<b>HOT ZONE</b>	- Exclusion Zone
<b>IDLH</b>	- Immediately Dangerous To Life & Health
<b>MREM/HR</b>	- Milli-roentgens Equivalent In Man Per Hour
<b>NIOSH</b>	- National Institute For Occupational Safety & Health
<b>OSC</b>	- On-scene Coordinator
<b>OSHA</b>	- Occupational Safety And Health Administration
<b>OVA</b>	- Organic Vapor Analyzer
<b>PEL</b>	- Permissible Exposure Limit (OSHA Reg., Enforceable by law)
<b>PPE</b>	- Personal Protective Equipment
<b>PPM</b>	- Parts Per Million
<b>RM</b>	- Response Manager
<b>SCBA</b>	- Self-contained Breathing Apparatus
<b>SOP</b>	- Standard Operating Procedure
<b>SPCC</b>	- Spill Prevention Controls & Countermeasures
<b>TAT</b>	- Technical Assistance Team
<b>TLV</b>	- Threshold Limit Value (ACGIH Recommendation)
<b>TWA</b>	- Time Weighted Average
<b>U.S. EPA</b>	- United States Environmental Protection Agency

## **SITE HEALTH AND SAFETY PLAN**

### **Phoenix-Goodyear Airport Site Installation and Sampling of Monitoring Wells**

#### **1.0 GENERAL INFORMATION**

Metcalf & Eddy (M&E) has modified the existing Health & Safety Plan (HSP) for the Phoenix-Goodyear Airport (PGA) site. The original HSP was prepared by ICF Technology Incorporated, Universal City, California and Bartholomew Engineering, Phoenix, Arizona. The modifications update the existing HSP to include the installation and sampling additional monitoring wells. The modified HSP should only be referenced for tasks covered under the new work order.

This plan contains general health and safety information related to the performance of remedial activities at the PGA site. The work is to be conducted at the Phoenix Goodyear Airport located in the City of Goodyear, Arizona. The remedial activities will include the construction and sampling of additional monitoring wells at PGA.

Based on the information available, the overall hazard for performance of the work under this plan is low. The chemical contamination found at the site is primarily confined to the aquifer with limited surface contamination. The primary chemical hazard found at the site is trichloroethylene (TCE) in the ground water beneath the site. While there is a potential for exposure to TCE in ground water, no volatile compounds have been detected in the air during previous field activities. Soil and ground water contaminated with chromium and cadmium have been identified, but are confined to the Goodyear Aerospace Corporation (GAC) Sludge Drying Beds. No activities covered by this plan are to be performed in, or near, the GAC beds.

Procedures identified in this plan adhere to accepted industry standards and applicable Federal and State regulations.

#### **1.1 INTRODUCTION**

This document describes the health and safety guidelines developed for the Phoenix-Goodyear Airport in Goodyear, Arizona. The HSP is developed to protect on-site personnel, visitors, and the public from physical harm and exposure to hazardous materials or waste. The procedures and guidelines contained herein were based upon the best available information at the time of the plan's preparation. Specific requirements will be revised when new information is received or conditions change. Any amendments to this plan will be included in Appendix E. Where appropriate, specific OSHA standards or other guidelines will be cited and applied.

This HSP plan will provide:

- Policy statements on the line of authority and accountability for implementing the program, the objectives of the program, and the role of site safety and health officer or manager and staff;
- Means or methods for the development of procedures for identifying and controlling workplace hazards at the site;
- Means or methods for the development and communications to employees of the various plans, work rules, standard operating procedures (SOPs) and practices that pertain to individual employees and supervisors;

- The training of supervisors and employees to develop needed skills and knowledge to perform their work in a safe and healthful manner;
- Means to anticipate and prepare for emergency situations, and
- Information feedback to aid in evaluating the program and for improving the effectiveness of the program.

## **1.2 OBJECTIVES**

This HSP provides general procedures to be followed during the construction activities at the PGA site. To insure the health and safety of field personnel, work conducted at the site will be performed in accordance with the procedures outlined in this plan. This HSP has been designed to meet the following objectives:

- To describe the known physical and chemical hazards and evaluate the associated risks;
- To define personnel responsible for the implementation and oversight of the health and safety procedures described herein;
- To provide general work rules pertinent to field work;
- To define work zones, respective safety procedures, and levels of protection;
- To define medical monitoring, equipment and personnel decontamination procedures;
- To define field monitoring procedures and their use in establishing levels of protection;
- To define emergency procedures for physical injury, chemical exposure, explosion, and fire incidents;
- To define the documentation requirements for Health and Safety Plan implementation;
- To provide background data and information on the chemical and toxicological properties of known and suspected contaminants; and
- To provide control procedures to prevent uncontrolled access to the work areas by unauthorized personnel.

All field work shall be performed in compliance with the U.S. Occupational Safety and Health Administration (OSHA) standard for Hazardous Waste Operations and Emergency Response (20 CFR Part 1910). Additional publications which should be consulted and complied with are the EPA Standard Operating Guidelines, as well as the NIOSH/OSHA/EPA/USCG Occupational Safety and Health Guidance manual for Hazardous Waste Site Activities. Health and safety considerations at the PGA site include exposure to chemicals and physical hazards associated with field operations.

This HSP is designed to protect personnel against:

- Direct skin contact with chemicals that may be present in surface/subsurface soils, ground and surface waters, and source areas;
- Inhalation of harmful levels of organic vapors and contaminated particulates, and

- Physical hazards including heat/cold stress.

### **1.3 GENERAL SAFETY REQUIREMENTS:**

The following general safety procedures shall be followed by all persons entering and/or working on the site:

- a. All persons involved in this project shall read and sign this Health & Safety Plan prior to entering or working on the site. The master copy (with signature sheet) of this Safety Plan will be held by the designated on-site Safety Officer. A signature sheet is provided in Appendix B of this plan.
- b. No employee or subcontractor may be allowed on-site without the prior knowledge and consent of the site Health & Safety Officer.
- c. There will be no activities conducted on-site without sufficient backup personnel to permit operation of a buddy system. At a minimum, two persons must be present at the site. Visual, voice or radio communication will be maintained at all times.
- d. All contractor or subcontractor personnel shall bring to the attention of the site Health & Safety Officer or resident project representative any unsafe condition or practice associated with the site activities.
- e. There will be no smoking, eating, chewing gum, drinking or application of cosmetics in the restricted area.
- f. Hands, face and all other potentially contaminated areas shall be thoroughly cleaned prior to smoking, eating or other activities outside the restricted area.
- g. Team members must avoid unnecessary contamination (i.e., walking through known or suspected "hot" zones or contaminated puddles, kneeling or sitting on the ground, leaning against potentially contaminated barrels or equipment).
- h. Respiratory devices may not be worn with beards, long sideburns, or under other conditions that prevent a proper seal.
- i. No contact lenses may be worn within the site "hot zones".
- j. All boring, excavation, heavy equipment operation, and general construction activities shall be performed in compliance with 29 CFR 1926.
- k. All project personnel who are likely to wear air purifying or air supplied respirators must first meet the training and medical requirements of 29 CFR 1910.120 and 29 CFR 1910.134.
- l. Aerial obstructions such as power lines and tree branches will be verified prior to erection of drill rig masts or movement of large equipment. A 20 foot horizontal clearance must be maintained between all aerial obstructions.
- m. Locations of subsurface utilities and buried bulk wastes shall be verified prior to any drilling or excavation activities.

- n. All accidents and/or injuries shall be immediately reported to the site safety officer. If necessary, a first report of injury will be initiated by the site safety officer and provided to the Regional Safety Officer for processing.

#### **1.4 PROJECT ORGANIZATION**

It is the policy of Metcalf & Eddy that all activities will be performed in a manner that is fully protective of employee health and conforms to all applicable health and safety regulations. M&E personnel that have a direct responsibility for health and safety concerns at the site are listed below with their detailed responsibilities.

The project is under the overall direction of a Project Manager, who ensures the establishment of appropriate responsibilities for hazard recognition, procedures, instruction, protective equipment, inspection, and all other elements of the M&E health and safety program.

A Site Safety and Health Officer (SSO) is appointed for each hazardous waste site. The SSO can appoint alternates to assure the presence of an SSO at all times when operations take place on site. The SSO conducts such ongoing inspections as necessary to determine the effectiveness of the site-specific safety and health plan, conducts and documents site briefings, ensures the proper selection and condition of monitoring equipment and personal protective equipment.

All project personnel are responsible for safe behavior, for reading and abiding by the site-specific health and safety plan, and for conducting operations safely.



## 2.0 SITE BACKGROUND

### 2.1 FACILITY DESCRIPTION

The Phoenix-Goodyear Airport (PGA) site is situated near the City of Goodyear, approximately 20 miles west of Phoenix, Arizona, as shown in Figure 1. In 1985, the combined population of the Goodyear and Avondale area was 30,000. The current land uses in the vicinity of the site consist of agriculture, industry, and residential developments. Figure 2 presents a more detailed view of the PGA site.

During the 1940s and 1950s, aircraft maintenance operations were conducted at PGA. Historic operations used chlorinated solvents for degreasing engine and machine parts.

In 1983, the PGA site was placed on EPA's National Priorities List subsequent to ground water monitoring studies performed in 1982 and 1983 which identified six area wells that were contaminated with TCE and exceeded the federal drinking water standard of 5 ppb. Section 16 lies in the southern area and includes the Loral Corporation facility (formerly owned by Goodyear Aerospace Corporation) and the Phoenix-Goodyear Airport (formerly owned and operated by the U.S. Navy). Included in Figure 2 are the approximate locations of existing wells and of proposed monitoring well locations.

On September 6, 1988, the U.S. EPA and Goodyear entered into a consent decree. Under the provisions of the consent decree, Goodyear agreed to perform an operable unit (OU) remedial action at the PGA site. The OU remedy involves pumping ground water to contain the spread of TCE beneath Section 16, treating it, and then reinjecting the clean, treated water into the ground.

On September 26, 1989, the U.S. EPA issued a Record of Decision for the PGA site. Based on the PGA RI/FS, the preferred alternatives for the south portion of the site consists of extraction and treatment of Subunit B/C ground water, and soil vapor extraction for the vadose zone.

### 2.2 CHEMICAL/WASTE CHARACTERISTICS

Chemicals and wastes at the PGA site are present as liquids, solids, sludge, gases, and vapors. The chemicals and waste materials at the site may be characterized as: corrosive, volatile, toxic, and reactive. Chemical names of materials known to be present at the PGA site are shown in Table 1.

### 2.3 SITE FEATURES

The site encompasses an operational airport (Goodyear Municipal Airport), industrial facilities occupied by Loral Corporation, and the Arizona Training Center.

The PGA site contains railroad tracks, airport operational facilities and a runway, industrial installations, commercial and residential establishments, and above-ground and underground utilities.

### 2.4 SITE HISTORY

Recent soil boring and ground water analyses have shown the presence of contaminants in soil and ground water. Several drinking water wells in the area exceeded action levels for TCE and had to be shut down. The residents were provided bottled water. No injuries as a result of the presence of hazardous wastes at the site have been reported in the past. Previous environmental monitoring has indicated the following:

Project #:006791-0002-001  
Date: September 5, 1991  
Revision: #1

**Figure One**

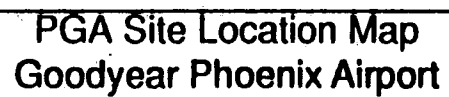
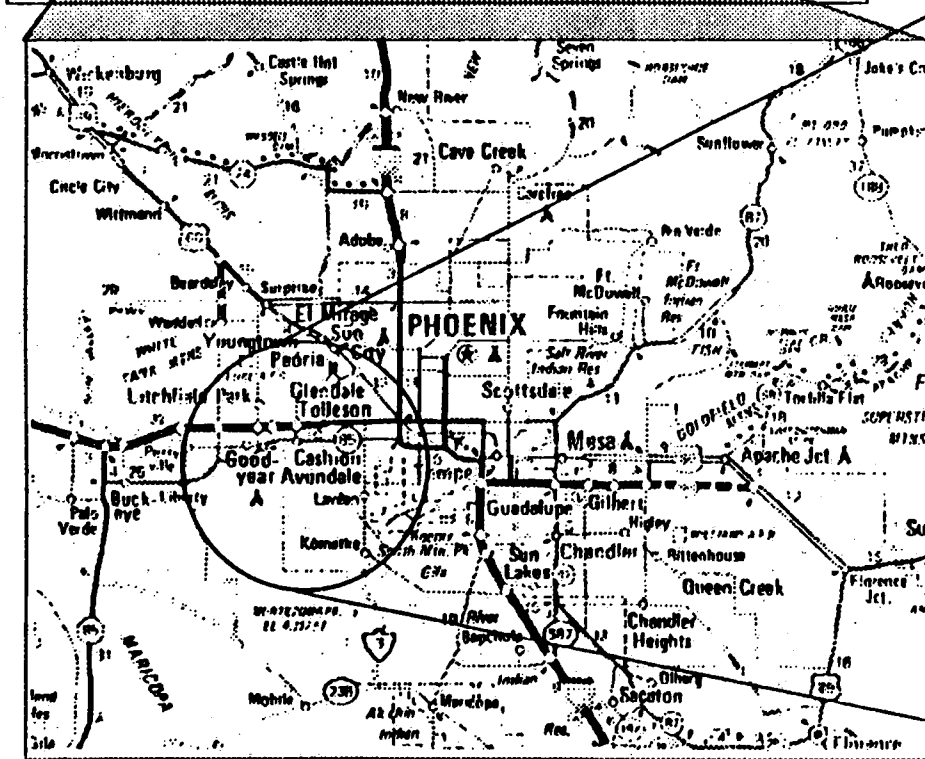


Figure 1

**Air Monitoring.** Air monitoring during previous ground water sampling and other field activities indicated no detectable volatile organic compounds at the well heads or elsewhere on site using field organic vapor detection instruments.

**Ground Water Monitoring.** In 1981 the Arizona Department of Health Services (ADHS) discovered that the ground water in the PGA area was contaminated with solvents and chromium. Additional sampling of area wells by ADHS and the EPA in 1982 and 1983 respectively, discovered 18 wells contaminated with TCE, six of which exceeded the 5.0 ppb ADHS and EPA drinking water action level for TCE. The results of EPA's remedial investigations indicate the ground water contamination consisted primarily of VOCs and chromium. Maximum concentrations of VOCs and inorganics detected in the ground water samples collected from on-site production and monitoring wells, are presented in Table 1.

**Soil Analysis.** Surface and subsurface soil samples have been collected by Goodyear and the U.S. EPA during the last several years to determine levels of priority pollutants, pesticides, and metals. Maximum concentrations of chemicals reported at concentrations above detection limits in soil samples collected from various locations are given in Table 1. The contaminants reported at the site are generally present in very low concentrations.

Elevated levels of chromium and cadmium were reported in the Goodyear Aerospace Corporation (GAC) sludge drying bed area soils only. However, no field activity listed in the Scope of Work is to be conducted in the sludge bed area. Therefore, there is no known potential for exposure to workers to elevated levels of chromium and cadmium in the proposed activity area.

### **3.0 SCOPE OF WORK**

#### **DRILLING AND CONSTRUCTION OF GROUND WATER MONITORING WELLS**

Ground water monitoring wells will be installed in the Subunit C downgradient of the site. Eight clusters of monitoring wells will be installed using air rotary technique to a depth of 320 feet. The air rotary technique will advance a spin casing ahead of the tricone bit to minimize aeration of surrounding formations. Split spoon samples will be collected a five foot intervals.

The monitoring well will be constructed using two inch stainless steel riser and screen. A 0.01 inch 50 foot slot screen will be installed at a depth to be determined by the on-site geologist. The screen will be packed by allowing the natural formation to collapse around it. A bentonite plug will be installed five feet about the screen and the casing grouted. Dedicated pumps will be installed in all well clusters.

## 4.0 HAZARD EVALUATION

### 4.1 CHEMICAL HAZARDS

Soil and ground water sampling results summarized in Table 1 indicate that TCE and chromium are the only toxic chemicals that were reported at levels that may have potential inhalation, dermal, or ingestion exposure to workers at the site engaged construction and installation of monitoring wells.

A maximum of 350 mg/l of TCE and 1.34 mg/l of total chromium were reported in some wells in the activity area. A maximum of 2.5 mg/kg of TCE were reported in some soil borings at the site. Although 32,243 mg/kg of total chromium and 112 mg/kg of cadmium were reported in the sludge drying beds, no activity is planned for this area during the well construction and sampling. Therefore, these elevated concentrations of chromium and cadmium will not be taken into account in determining chemical hazards and personnel protection levels during field operations covered by this plan. The concentration of other VOCs and toxic metals in ground water and soils were detected at very low concentrations or were below the TLV and/or PEL levels and thus do not have a significant potential of exposure.

The primary potential exposure hazard at this site during activities covered by this plan is due to the presence of TCE in soil and ground water. The potential hazards associated with TCE are described below:

#### 4.1.1 Health Effects of TCE

TCE is a volatile chlorinated hydrocarbon solvent. Industrially, acute inhalation exposures above 500 ppm produce typical organic solvent CNS effects such as dizziness and narcosis. Experience with this substance in anesthesia has shown it capable of sensitizing the heart to adrenalin.

Chronic inhalation exposures of 50-100 ppm have caused liver cancer in mice. For this reason, NIOSH recommends an exposure limit of 25 ppm, and also considers TCE a potential human carcinogen. ACGIH recommends a TLV of 50 ppm.

TCE presents the highest toxic hazard of all VOCs detected on-site because of the high levels found (see Table 1). Other VOCs detected are all volatile chlorinated hydrocarbons. Carbon tetrachloride and chloroform produce liver and kidney toxicity after chronic inhalation exposures above 10 ppm.

#### 4.1.2 Exposure Assessment for TCE

The potential for TCE exposure from contact with and proximity to contaminated soil is estimated as low. Soil sampling results indicate that TCE is present in the soil at a maximum 2.5 mg/kg. This level does not represent a potential hazard. However, every effort will be made by the field team to limit contact with contaminated soil and ground water by proper PPE selection.

TABLE 1

**MAXIMUM CONCENTRATIONS OF CHEMICALS REPORTED IN SOIL AND  
GROUNDWATER AT PGA SITE AND TOXICITY CHARACTERISTICS**

Chemicals	Soil	Groundwater	TLV		PEL		IDLH		Target Organs	Potential Exposure Routes
	Maximum Conc. mg/kg		Maximum Conc. ug/l	ppm	mg/m3	mg/m3	ppm	mg/m3		
Organics:										
Trichloroethylene	2.5	16,200	50	270	50	-	1,000	-	Suspected carcinogen, CNS, liver, respiratory	1,2,3
1,1-Dichloroethylene	0.4	140	5	20	1.0	-	-	-	Suspected carcinogen, CNS, liver, kidney	1,2,3
Trans-1,2,-Dichloroethylene	-	3.6	200	790	200	790	-	-	CNS, liver, kidneys, respiratory sys.	1,2,3
1,1-Dichloroethane	-	3.3	200	516	100	400	4,000	-	Suspected carcinogen, liver, kidneys	1,2,3
1,2-Dibromoethane	-	2	A2	-	20	-	400	-	Suspected carcinogen, liver, kidneys	1,2,3
Acetone	-	3	750	1,780	750	1780	20,000	-	Respiratory system	1,2,3
Carbon tetrachloride	-	5.1	5A2	30	2	-	300	-	Suspected carcinogen, CNS	
Chloroform	-	12.8	10A2	50	2	-	-	-	Suspected carcinogen, liver, kidney, Heart, eyes, skin	1,2,3
Methylene chloride	-	13.2	50A2	175	500	-	5,000	-	CNS, CVS, skin, eyes	1,2,3
Toluene	-	16	100	375	100	-	2,000	-	CNS, liver, kidneys, skin	1,2,3
Total xylenes	-	8,800	100	240	100	480	10,000	-	CNS, liver, kidneys, eyes, skin	1,2,3
Trichlorofluoromethane	0.5	-	1,000	5,600	100	Cell	-	-	CNS, respiratory sys.	1,2,3
Chlorobenzene	0.5	-	75	350	75	350	2,400	-	CNS, liver, respiratory sys.	1,2,3
4-DDT	0.8	-	-	1	-	1	-	-	Suspected carcinogen, skin, respiratory sys.	1,2,3
4-DDE	1.2	-	-	1	-	1	-	-	Suspected carcinogen, skin, respiratory sys.	1,2,3

TABLE 1 (Continued)

**MAXIMUM CONCENTRATIONS OF CHEMICALS REPORTED IN SOIL AND  
GROUNDWATER AT PGA SITE AND TOXICITY CHARACTERISTICS**

<u>Chemicals</u>	<u>Soil</u> <u>Maximum</u> <u>Conc.</u>	<u>Groundwater</u> <u>Maximum</u> <u>Conc.</u>	<u>TLV</u>		<u>PEL</u>		<u>IDLH</u>		<u>Target Organs</u>	<u>Potential</u> <u>Exposure</u> <u>Routes</u>
	<u>mg/kg</u>	<u>ug/l</u>	<u>ppm</u>	<u>mg/m3</u>	<u>mg/m3</u>	<u>ppm</u>	<u>mg/m3</u>	<u>mg/m3</u>		
<u>Metals:</u>										
Aluminum	16,817	3,020	--	2	--	2	--	--	Lungs	2,3
Antimony	--	360	--	0.5	--	0.5	--	--	Respiratory sys., CVS, skin, eyes	2,3
Arsenic	16	28	--	0.2	--	0.01	--	--	Suspected carcinogen, liver, kidneys, lungs	2,3
Barium	218	900	--	0.5	--	0.5	--	30	Heart, CNS, respiratory sys., eyes	2,3
Chromium (Total)	32,242**	1,340	--	0.05 (vi)A1 0.5(iii)	--	0.1(vi) 0.5(iii)	--	250	Liver, kidneys, respiratory sys., skin, eyes	2,3
Copper	27	40	--	1.0 0.2 fume	--	1.0 0.1 fume	--	--	Respiratory sys., skin, liver	2,3
Cyanide	--	10	--	3	--	5	--	50	CNS, CVS, liver, kidney, blood	2,3
Lead	30	20	--	0.15	--	0.05	--	--	CNS, kidneys, blood	2,3
Zinc	81	3,580	--	--	--	--	--	--	Respiratory sys., skin, eyes	2,3
Cadmium	112**	--	--	0.05	--	0.1	--	40	Respiratory sys., kidney, prostate, blood	2,3

\* 1 = Inhalation; 2 = Skin Absorption; 3 = Ingestion

\*\* Concentrations of cadmium and chromium in soil samples were highest at the GAC Sludge Drying Beds. No activities covered by this plan are to be undertaken in or near the Sludge Drying Beds.



## **4.2 PHYSICAL HAZARDS OF SITE**

### **4.2.1 Drilling and Construction of Ground Water Monitoring Wells**

Drilling operations involve use of heavy equipment and machinery, and physical trauma can occur. The drilling contractor will follow appropriate safety precautions and engineering controls to minimize the risk of physical injuring during drilling and construction of monitoring wells. The air rotary casing will be monitored for volatile organic compounds and lower explosive limit during drilling operations. Table two covers action levels to be adhered to during all phases of work. Hard hat, steel toe and shank boots, and safety glasses will be worn in the construction area.

### **4.2.2 Heat Stress**

Heat stress is probably the most serious potential physical hazard associated with the PGA site. Summer temperatures in the Phoenix area frequently exceed 100°F and construction personnel are subject to heat stress. The contractor and subcontractors should develop and implement a heat stress management protocol in keeping with OSHA, NIOSH, and ACGIH recommendations. Appendix A provides details on heat stress management.

## **5.0 SITE OPERATIONS**

### **5.1 ENVIRONMENTAL MONITORING EQUIPMENT REQUIREMENTS**

A variety of environmental monitoring instruments will be required to assess conditions during field operations. The number of monitoring instruments needed will depend on the number of concurrent operations in progress at the site. This will be determined prior to field mobilization. The following is a list of instruments required for field operations:

- Volatile Organic Compound Monitor – either flame or photoionization detector;
- Combustible Gas Indicator (CGI).

### **5.2 OPERATING PROCEDURES AND METHODS FOR SURVEILLANCE**

Instruction manuals will be followed for instrument calibration and operation. During invasive construction operations and well sampling, air in the breathing zone will be monitored regularly with an organic vapor detector (either photoionization or flame ionization detector). Combustible gas and oxygen levels will be monitored regularly with a combustible gas/oxygen meter during invasive operations and prior to any cutting, welding, or grinding operation.

Action levels for environmental monitoring and required levels of protective equipment are shown in Table 2.

### **5.3 PERIMETER ESTABLISHMENT**

The location of areas of known surface contamination (the chrome sludge pits) is established and the area is fenced. All construction/drilling work will be conducted inside the Phoenix Goodyear Airport property. As part of the normal security for an active airport, this part of the PGA site is surrounded by chain link fence with access controlled by a security guard. No public access is permitted in the construction area without passing through the control point. Exclusion zones will be established as needed at each individual work location and delineated with temporary barriers.

**TABLE 2**  
**ACTION LEVELS**

<u>Monitor Results</u>	<u>Action</u>
HNu/OVA readings are 0 - 12 ppm* in the breathing zone .....	Level D PPE
HNu/OVA readings are 12 - 200 ppm** in the breathing zone .....	Level C PPE
HNu/OVA readings are > 200 ppm in the breathing zone .....	Withdraw and implement engineering controls using Level B PPE until levels below 200 ppm are obtained.
If Oxygen meter indicates <19.5% or >25% O <sub>2</sub> .....	Withdraw and implement engineering- controls to restore normal O <sub>2</sub> level.
If Combustible Gas Meter indicates:	
<10% LEL .....	Work as normal.
10%-20% LEL .....	Monitor Continuously
>20% LEL .....	Withdraw and implement engineering- controls to reduce combustible gas

\* Volatile action level is selected to be 50% of the NIOSH recommended 10-hour exposure limit for TCE of 25 ppm.

\*\* Maximum concentration should not exceed the Short Term Exposure Level (STEL) averaged over 15 minutes without respiratory protection.

## 6.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

Personal Protective Equipment (PPE) will be utilized as indicated by on-site environmental monitoring. All previous field operations at the site have been conducted in Level D protective equipment. It is anticipated that most, if not all, work performed under this plan will be conducted in Level D PPE. Site personnel should be equipped to upgrade PPE to Level C if needed. The following sections describe the recommended equipment for each level of protection. Other speciality field activities (e.g., field welding, excavation, etc.) will require other specific protective measures and equipment which will be designated by the SSO.

### 6.1 LEVEL D PPE

Level D PPE is used when no respiratory protection is required and minimum skin protection is required. This level will not be worn in exclusion zones where action levels (given in Table 2) warrant Level C protection. The following equipment constitute Level D gear:

#### RECOMMENDED:

- Tyvek<sup>®</sup>
- Coveralls.
- Steel toe and steel shank safety boots/shoes.
- Safety glasses or chemical splash goggles.
- Hard hat.
- Inner surgical and outer Nitrile chemical resistant gloves.

#### OPTIONAL:

- Escape mask.
- Face shield.

### 6.2 LEVEL C PPE

Level C PPE is used when types of air contaminants have been identified, concentrations measured, and a canister or a set of cartridges are available that can remove the contaminant. The atmosphere where level C protective equipment is used must not exceed IDLH levels and must contain at least 19.5 percent oxygen. The following equipment constitute Level C protection gear:

#### RECOMMENDED:

- Full-face piece, air-purifying, twin cartridge or canister-equipped respirator.
- Chemical-resistant clothing (hooded, one- or two-piece chemical splash suit; disposable chemical-resistant one-piece suit).
- Inner surgical and outer Nitrile chemical-resistant gloves.
- Chemical-resistant steel toe and steel shank safety boots/shoes.

- Hard hat.
- Two-way radio communications.
- Emergency escape air pack.

**OPTIONAL:**

- Face shield.

**6.3 RECOMMENDED LEVELS OF PROTECTION BY TASK****6.3.1 Drilling and Construction of Ground Water Monitoring Wells**

<u>Personnel</u>	<u>Respiratory</u>	<u>Clothing</u>	<u>Other</u>
Team Leader	D	Tyvek coveralls, steel toe/shank safety boots, inner surgical gloves, and outer Nitrile gloves, hard hat, safety glasses	Splash Goggles as needed
Site Health and Safety Officer	D	Tyvek coveralls, steel toe/shank safety boots, inner surgical gloves, and outer Nitrile gloves, hard hat, safety glasses	Splash Goggles as needed
Drilling Subcontractor Personnel	D	Tyvek coveralls, steel toe/shank safety boots, inner surgical gloves, and outer Nitrile gloves, hard hat, safety glasses	Splash Goggles as needed

## **7.0 SITE PERSONNEL RESPONSIBILITIES**

Each company working with employees at the PGA site shall be responsible for the safety of its own employees. Before work begins, each implementing firm will be required to appoint a Site Safety Officer and prepare a site specific Health and Safety Plan for their employees.

The Project Manager shall be responsible for all aspects of the construction, including compliance with OSHA rules and this HSP. The Project Manager will assign a Project Health and Safety Officer who will be responsible for assuring that each implementing firm has a plan and is implementing it in accordance with OSHA requirements.

### **7.1 PROJECT MANAGER - (assisted by Site Safety and Health Officer SSO and (where applicable) the Site Manager)**

Ensures appropriate personal protective equipment and monitoring equipment available, used by all personnel;

Ensures that personnel receive the H&S Plan, understand its provisions, are instructed in safe work practices, and are familiar with planned emergency procedures;

Documents instruction in the H&S Plan for all involved in project activities or visiting areas under project control.

Ensures that all field personnel have had a minimum of 40 hours training offsite and 3 days onsite training;

Ensures that personnel are aware of the potential hazards associated with site operations through their active participation in the initial site safety briefing;

Monitors safety performance of all personnel to ensure the required work practices are followed;

Corrects work practices or conditions that may result in personal injury, exposure to hazardous substances, or release of a hazardous material;

Prepares and/or requires others as appropriate to prepare any accident/ incident reports in conformance with M&E policy and any additional contractual requirements that apply. Assures that reports are distributed to the Regional Health & Safety Manager, the Corporate Health & Safety Officer, the USATHAMA Project Officer, and the USATHAMA Safety Officer.

### **7.2 SITE MANAGER (May be the same individual as the Project Manager in some cases)**

The senior M&E person on site, responsible for coordinating all aspects of the field activity from onsite to assure a safe and successful conclusion.

### **7.3 SITE SAFETY AND HEALTH OFFICER (SSO)**

The SSO or a designated alternate will be at the site every day that work is being performed by M&E or an M&E subcontractor.

Implements H&S Plan and verifies compliance with safety and health requirements. Reports to the Project Manager any need for action if there are any deviations from the anticipated conditions described in the plan. Authorizes and/or orders the cessation of work, if necessary.

Calibrates monitoring equipment daily and records results in accordance with the H&S Plan.

Ensures that all monitoring equipment is operating correctly according to the manufacturer's instructions.

Confirms that training and medical surveillance requirements are met by all involved in the project.

Conducts and documents site briefings - at a minimum, the SSO conducts a pre-site entry briefing and briefing of all new personnel arriving on site.

Ensures that follow-up action after an incident/accident is taken to prevent recurrence.

Conducts inspections as necessary to determine the effectiveness of the site-specific health and safety plan.

#### **7.4 ALL PROJECT PERSONNEL**

Read the site-specific health and safety plan and acknowledge that they have read and understand the plan as appropriate for their assigned roles in the project.

Take all reasonable precautions to prevent injury to self or any other person.

Perform only tasks they reasonably expect to perform safely.

Report any accidents or unsafe conditions (they cannot themselves correct immediately) to the SSO or Project Manager.

Notify the SSO of any special medical problems such as allergies and ensure that appropriate personnel are aware of such potential problems.

#### **7.5 FIELD PERSONNEL**

All field personnel must comply with the provisions of this site safety plan, and sign the signature form presented in this plan. All field personnel must practice contaminant avoidance at all times.

#### **7.6 WORK LIMITATIONS**

All site work will be done during daylight hours. The buddy system will be in effect at all times when exposure potentials are present in the work or in the work area being occupied.

## **8.0 DECONTAMINATION AND DISPOSAL PROCEDURES**

### **8.1 DECONTAMINATION PROCEDURES**

Exclusion zones will be established at the site during various operations. Decontamination of construction vehicles (backhoes, bulldozers, cement mixers, drilling equipment); soil and ground water sampling equipment; and personal gear will be conducted as needed when leaving exclusion zones. The following sections describe recommended decontamination procedures for various equipment and vehicles.

#### **8.1.1 Construction Vehicles**

Equipment used in invasive operations (trenching, excavation, or drilling) will be steam cleaned before leaving the site. A heavy plastic decontamination pad will be constructed at the construction site to clean the vehicles. The decon water will be collected according to the procedures outlined in the drilling equipment decontamination procedures.

#### **8.1.2 Drilling Equipment Decontamination**

Before drilling operations are undertaken, the drill rigs and all drilling tools will be thoroughly steam cleaned at the driller's storage yard. The rig will be inspected to verify that there are no fluid leaks and that the rig is in proper and safe operating condition. Any unacceptable conditions encountered during this inspection will be remedied before the rig is taken onto the site.

The drilling tools will also be steam cleaned after each boring is completed. The continuous core sampler will be decontaminated with water and detergent after each sample is collected. The entire rig will be steam cleaned at the completion of the project and before it leaves the site at any time.

A temporary decontamination pad will be constructed for cleaning the drilling rig, other vehicles (if needed) and other large pieces of equipment. After being cleaned, the drill tools will be kept clean. Tools may not be laid on contaminated or potentially contaminated soil, and must be kept on the rig or laid on plastic sheeting.

#### **8.1.3 Support Vehicles**

Interiors of construction support vehicles will be swept and washed with a household cleaner and paper toweling on an as-needed basis. It is recommended that all vehicles except drilling rigs and necessary construction equipment, be kept in uncontaminated, paved areas and therefore should not require decontamination.

#### **8.1.4 Personal Gear**

All personal equipment will be left on-site or thoroughly decontaminated at the end of the work shift. To the extent possible, outer clothing (including boots, coveralls and gloves) should be left on-site throughout the construction project. This will minimize the spread of contaminants to vehicles or employees' homes. After removing any protective clothing, all workers should wash face and hands before leaving the site, and should shower as soon as possible after the work shift.

#### **8.1.5 Soil and Ground Water Sampling Equipment**

All sampling equipment which comes into contact with soil or ground water samples will be decontaminated, including the continuous core sampler, sample rings, bailers, transfer vessels, and funnels.



## **8.2 DISPOSAL PROCEDURES**

### **8.2.1 On-Site Disposal**

There will be three types of wastes generated during the site activities:

- Drill cuttings (box or covered piles);
- Equipment decontamination rinse water; and
- Disposable clothing.

Soils suspected of being contaminated will be labelled with site source location and will be temporarily stored on site at a secured location. Test results from the sampling of soils will determine if contaminant levels exceeded the Arizona State action levels and would require disposal as hazardous waste. Goodyear will be responsible for disposal of waste material generated during field activities.

Disposable clothing used in areas suspected of contamination will be stored separately and identified by location. If soils from that area are found to be contaminated, then the clothing will be disposed of as contaminated material with the soil. Otherwise, the clothing will be treated as common solid waste.

Monitoring well development and purge water and equipment decontamination rinse water will be disposed of in the City of Goodyear's sewer system under a permit from the City of Goodyear.

### **8.2.2 Off-Site Disposal**

If determined hazardous, the soils will be disposed of by Goodyear at a licensed and permitted facility. M&E will assist Goodyear by assuring that wastes are properly labeled, segregated and sampled to minimize disposal costs.

## **9.0 TRAINING AND MEDICAL SURVEILLANCE PROTOCOL**

### **9.1 EMPLOYEE CERTIFICATION FORM**

The on-site Health & Safety Officer or designated representative shall be responsible for informing all individuals entering the exclusion zone or decontamination reduction zone of the contents of this plan and ensuring that each person signs the Employee Certification Form in Appendix B. By signing the Employee Certification Form, individuals are recognizing the hazard present on-site and agreeing to abide by the policies and procedures required to minimize exposure or adverse effects of these hazards.

### **9.2 TRAINING REQUIREMENTS**

All personnel (including visitors) entering the exclusion zone or decontamination reduction zone must have completed training requirements for hazardous waste site work in accordance with OSHA 29 CFR 1910.120 or by qualified by previous training or experience. Documentation of training requirements is the responsibility of each employer.

All personnel (including visitors) entering the exclusion zone or decontamination zone using a full-face negative pressure respirator must have received training on its use and successfully passed a qualitative respirator fit test in accordance with OSHA 29 CFR 1910.134; or, ANSI Standard Z88.2-1969 within the last 12 months. Documentation of fit testing protocol is required for the use of negative pressure respirators for protection against airborne asbestos fibers (OSHA 29 CFR 1926.58) and lead (OSHA 29 CFR 1910.1025).

All personnel (including visitors) entering the exclusion zone or decontamination zone using atmosphere supplying respiratory equipment must also have received training in its use, and must be in compliance with OSHA 29 CFR 1910.134 and ANSI Standard Z88.2-1969.

### **9.3 MEDICAL SURVEILLANCE**

All personnel (including visitors) entering the exclusion zone or decontamination zone must have completed appropriate medical monitoring requirements required under OSHA 29 CFR 1910.120 (f). Documentation of medical monitoring is the responsibility of each employer. If there are additional medical monitoring requirements for this site, evidence of compliance must also be included.

### **9.4 HEALTH AND SAFETY BRIEFING**

Daily safety meetings will be held at the start of each shift to ensure that all personnel understand site conditions and operating procedures, to ensure that personal protective equipment is being used correctly, and to address workers health and safety concerns. A record of all personnel attending the meeting and a summary of what was covered in the meeting will be kept in the field log book.

## **10.0 EMERGENCY INFORMATION**

### **10.1 REQUIRED EMERGENCY INFORMATION**

This HSP contains pertinent emergency information for use in the event of an on-site emergency. The HSP includes the following;

- Location of on-site resources (i.e.: water supplies, radio and telephone communications);
- Ambulance telephone-number;
- Hospital Emergency Room telephone number and directions to hospital from site;
- Poison Control Center telephone number;
- Fire Department telephone number;
- Project Manager telephone number;
- Project Health and Safety Coordinator telephone number; and
- Client Contact telephone number.

## 10.2 EMERGENCY PHONE NUMBERS

	<u>Name</u>	<u>Phone Numbers</u>
Ambulance	Glendale	(602) 931-5700
Hospital Emergency Care	Maryville Samaritan Hospital	(602) 848-5000
Poison Control Center	Good Samaritan Hospital	(602) 253-3334
Fire	City of Goodyear	(602) 932-3050
Police		
Explosives Unit (if applicable)	Phoenix Fire Department	(602) 262-6771
CHEMTREC		1-800-424-9300
TSCA Hotline		202-554-1404
CDC (Center for Disease Control)		404-454-4100 (24 hrs.) or 404-329-2888
National Response Center		1-800-424-8802
Pesticide Information Center		1-800-845-7633
EPA ERT Emergency		201-321-6660
RCRA Hotline		1-800-424-9346
Bureau of Explosives		202-835-9500

**Other Phone Numbers:**

**Corporate Health and Safety Officer**

(Work) (617) 246-5200

**Name: Richard Renzi**

(Home) (508) 475-0190

**Program Safety Officer**

(Work) (614) 890-5501

**Name: C. Herbert Hickman**

(Home) (614) 299-6148

**Project Manager**

(Work) (614) 890-5501

**Name: Todd Struttman**

(Home) (614) 899-1621

**Site Safety and Health Officer**

(Work) (614) 890-5501

**Name: Mike Raimonde**

(Home) (614) 777-0255

**Site Resources:**

**Water Supply**

NO

**Phone**

YES - in car

**Radio**

NO

**Electricity**

NO

**Lighting**

NO

**Rest Rooms**

YES

**Other**

**10.3. NOTIFICATION AND VERIFICATION:  
Directions to Hospital\* (Attach map)**

From Goodyear Airport, proceed north on Litchfield Avenue to Interstate 10. Take I-10 to 51st Street exit. Take 51st Street north to Campbell Avenue. Go left on Campbell Avenue. The hospital is on the corner of 51st Street and Campbell Avenue.

The route to the hospital was verified by \_\_\_\_\_ on \_\_\_\_\_.

**Present Status and Capability of Emergency Response Teams:**

\_\_\_\_\_ Able to respond to site emergencies. \_\_\_\_\_ Unable to respond to site emergencies.

\_\_\_\_\_  
On-Site Safety Officer

**10.4 EMERGENCY RESPONSE:****Line of Authority:**

The Site Safety Officer will assume command and direct emergency operations until such time as a more senior person (e.g. Site Manager) actively assumes command, in which case the Site Safety Officer will advise and assist in direction of operations. Civil authorities responding to an emergency assume command of operations, and will have pre-arranged methods of determining the line of authority.

**A. Injury/Exposure:**

In the event of an injury, the victim should be stabilized and provided onsite first aid in the "clean zone". If an injury involves a potential trauma to the spinal cord, the victim shall remain where injured, if safely possible, and be moved by trained emergency medical technicians only. Minor injuries such as small lacerations, cuts and strains shall be initially treated onsite by the first aid qualified member of the field team. Ambulance and hospital support shall be provided for all major injuries such as head wounds, broken bones, and deep lacerations. Should an injury involve a contaminant exposure, and there is no potential spinal cord trauma, perform the following procedures:

- Escort victim to the decontamination station
- Remove all contaminated clothing
- Wash exposed body areas with a potable water flush (10 minutes)
- Cover with blanket or (if injury is not serious) dress victim in clean clothing
- Transport victim (with the H&S Plan) to hospital if necessary

**B. Chemical/Oil Release - Spill Containment:**

In the event a hazardous material release occurs during the site investigation activities, attempt to control, divert, absorb, neutralize, or secure the source, if direct contact or inhalation hazards are not present. If direct contact or inhalation hazards are present, do not

\* Emergency phone numbers and maps to the hospital will be posted in the office, decontamination area and all vehicles.

attempt any remedial measures. All hazardous material release incidents shall be reported to the appropriate state EPA office. The following information should be provided during a notification:

- Chemical/oil name or DOT LD. number
- Chemical/oil hazard class
- Cause of release
- Quantity concentration of release

**C. Fire/Explosion:**

In the event of a fire, attempt to extinguish it with a Class ABC, fire extinguisher if safe to do so. If the fire appears to be growing "out of control", perform the following steps as applicable:

- Pull site horn warning alarm
- Evacuate field team to the site entrance (relocate this assembly point if necessary)
- Verify all present
- Notify Fire Department
- Remove vehicles if safely possible
- Remove flammable field solvents if safely possible
- Await fire fighting forces
- Contact the Project Manager and the Regional Safety Coordinator once the Fire Department is in control of the situation

**D. Emergency Evacuation Routes:**

To be determined by the SSO prior to beginning work.

**E. Emergency Alerting Procedures:**

See the Emergency Response Equipment Map containing the location of all emergency response equipment. This map will be posted at entrance to all zones.

## **Emergency Response Equipment Map**

**Fire Extinguishers:**

**Eyewash/Shower Station:**

**Alarm Systems:**

**Emergency Phone:**

**First Aid Kits/Equipment:**



## **Emergency Response Equipment Map**

**Fire Extinguishers:**

**Eyewash/Shower Station:**

**Alarm Systems:**

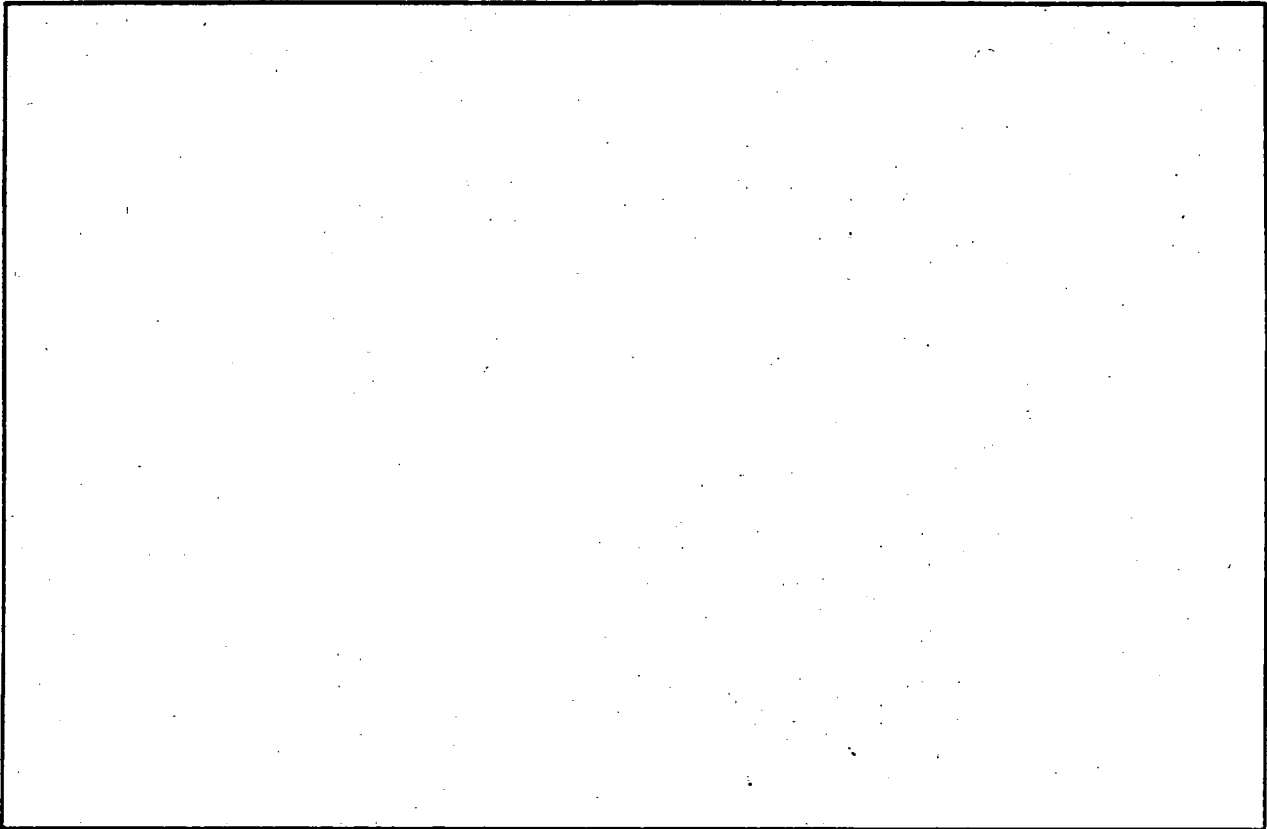
**Emergency Phone:**

**First Aid Kits/Equipment:**

Project #:006791-0002-002

Date: September 5, 1991

Revision: #1



### 11.0 PLAN REVIEW

This site health and safety plan has been written for the exclusive use of Metcalf & Eddy, Inc. employees. M&E claims no responsibility for its use by others. The plan is written for the specified site conditions, dates, and personnel and must be amended if these conditions change.

PLAN PREPARED BY:

\_\_\_\_\_

DATE: \_\_\_\_\_

REVIEWED BY:

\_\_\_\_\_

Regional Safety Coordinator

DATE: \_\_\_\_\_

\_\_\_\_\_

Corporate Health and Safety Officer

DATE: \_\_\_\_\_

## **12.0 HEALTH & SAFETY LOG BOOK**

The on-site Health & Safety Officer will keep a log book to record site Health and Safety information and to document subcontract personnel working on-site and other site visitors. At a minimum, the following information will be included in the log book on a daily basis:

- Date and time of observations
- Weather conditions
- Personnel on-site (w/company title)
- Air monitoring equipment in use
- Work activity conducted
- Level(s) of protection
- Air monitoring equipment readings obtained during work activity
- Any health & safety-related issues or situations.
- Any communications with regulatory agencies
- Signature of on-site Health and Safety Officer

### **13.0 HEALTH & SAFETY FIELD ACTIVITY RECORD**

**A daily record of field activities is to be recorded on in the Site Field books.**

## **APPENDIX A**

### **HEAT STRESS MANAGEMENT**

## **APPENDIX A**

### **HEAT STRESS MONITORING**

Elevated temperatures during summer months at the PGA site necessitate a heat stress monitoring program to be implemented. The program follow the guidelines established by ACGIH and NIOSH. The site workers must learn to recognize and treat the various forms of heat stress as summarized below:

#### **1. HEAT STRESS**

Heat stress usually is a result of protective clothing decreasing natural body ventilation, although it may occur at any time work is being performed at elevated temperatures.

If the body's physiological processes fail-to maintain a normal body temperature because of excessive heat, a number of physical reactions can occur ranging from mild (such as fatigue, irritability, anxiety, and decreased concentration, dexterity, or movement) to fatal. Because heat stress is one of the most common and potentially serious illnesses at hazardous waste sites, regular monitoring and other preventative measures are vital.

The best approach is preventative heat stress management. In general:

Have workers drink 16 ounces of water before beginning work, such as in the morning or after lunch. Provide disposable, 4 ounce cups, and water that is maintained at 50° - 60°F. Urge workers to drink 12 of these cups water every 20-minutes, for a total of 1-2 gallons per day. Provide a cool place for rest breaks. Discourage the use of alcohol and the intake of coffee. Monitor for signs of heat stress.

Acclimatize workers to site work conditions by slowly increasing workloads, i.e., do not begin site work activities with extremely demanding activities.

Provide cooling devices to aid natural body ventilation. These devices, however, add weight, and their use should be balanced against worker efficiency. An example of a cooling aid is long cotton underwear which acts as a wick to help absorb moisture and protect the skin from direct contact with heat-absorbing protective clothing.

Install mobile showers and/or hose-down facilities to reduce body temperature and cool protective clothing.

In hot weather, conduct field activities in the early morning or evening.

Ensure that adequate shelter is available to protect personnel against heat, as well as cold, rain, snow, etc., which can decrease physical efficiency and increase the probability of both heat and cold stress. If possible, set up the command post in the shade.

In hot weather, rotate shifts of workers wearing impervious clothing.

Good hygienic standards must be maintained by frequent changes of clothing and showering. Clothing should be permitted to dry during rest periods. Persons who notice skin problems should immediately consult medical personnel.

## **2. HEAT STROKE**

Heat stroke is an acute and dangerous reaction to heat stress caused by a failure of heat regulating mechanisms of the body the individual's temperature control system that causes sweating stops working correctly. Body temperatures rises so high that brain damage and death will result if the person is not cooled quickly.

Symptoms: Red, hot, dry skin, although person may have been sweating earlier; nausea; dizziness; confusion; extremely high body temperature, rapid respiratory and pulse rate; unconsciousness or coma.

Treatment: Cool the victim quickly and obtain medical help immediately! If the body temperature is not brought down fast, permanent brain damage or death will result. Soak the victim in cool but not cold water, sponge the body with cool water, or pour water on the body to reduce the temperature to a safe level (102°F). Observe the victim and be ready to provide respiratory support if needed. Do not give coffee, tea or alcoholic beverages.

## **3. HEAT EXHAUSTION**

Heat exhaustion is a state of very definite weakness or exhaustion caused by the loss of fluids from the body. The condition is much less dangerous than heat stroke, but it nonetheless must be treated.

Symptoms: Pale, clammy, moist skin, profuse perspiration and extreme weakness. Body temperature is normal, pulse is weak and rapid, breathing is shallow. The person may have a headache, may vomit, and may be dizzy.

Treatment: Remove the person to a cool, air conditioned place, loosen clothing, place in a head-low position, and provide bed rest. Consult a physician. The normal thirst mechanism is not sensitive enough to ensure body fluids replacement. Have patient drink 1-2 cups water immediately, and every 20-minutes thereafter, until symptoms subside. Total water consumption should be about 1-2 gallons per day.

## **4. HEAT CRAMPS**

Heat cramps are caused by perspiration that is not balanced by adequate fluid intake. Heat cramps are often the first sign of a condition that can lead to heat stroke.

Symptoms: Acute painful spasms of voluntary muscles; e.g., abdomen and extremities.

Treatment: Remove victim to a cool area and loosen clothing. Have patient drink 1-2 cups water immediately, and every 20-minutes thereafter, until symptoms subside. Total water consumption should be 1-2 gallons per day. Consult with physician.

## **5. HEAT RASH**

Heat rash is caused by continuous exposure to heat and wet conditions and aggravated by chafing clothes. The condition decreases ability to tolerate heat.



**Symptoms:** Mild red rash, especially in areas of the body in contact with protective gear.

**Treatment:** Decrease amount of time in protective gear, and provide powder to help absorb moisture and decrease chafing.

## **6. HEAT STRESS MONITORING AND WORK CYCLE MANAGEMENT**

For strenuous field activities that are part of on-going site work activities in hot weather, the following procedures shall be used to monitor the body's physiological response to heat, and to manage the work cycle, even if workers are not wearing impervious clothing.

**Measure Heart Rate (HR).** Heart rate should be measured by the radial pulse for 30 seconds as early as possible in the resting period. The HR at the beginning of the rest period should not exceed 110 beats/minute. If the HR is higher, the next work period should be shortened by 33%, while the length of the rest period stays the same. If the pulse rate still exceeds 110 beats/minute at the beginning of the next rest period, the following work cycle should be further shortened by 33%. The procedure is continued until the rate is maintained below 110 beats/minute.

**Measure Body Temperature.** Body temperature should be measured orally with a clinical thermometer as early as possible in the resting period. Oral temperature (OT) at the beginning of the rest period should not exceed 99.6°F. If it does, the next work period should be shortened by 33%, while the length of the rest period stays the same. If the OT exceeds 99.6°F at the beginning of the next period, the following work cycle should be further shortened by 33%. The procedure is continued until the body temperature is maintained below 99.6°F.

**Manage Work/Rest Schedule.** The following work/rest schedule shall be used as a guideline:

<u>Adjusted Temperature (OF)</u>	<u>Active Work Time (min/hr) Using Level B/C Protective Gear:</u>
75 or less	60
80	40
85	30
90	20
95	10
100	0

To calculate the adjusted temperature:

$$T \text{ (adjusted)} = T \text{ (actual)} + (13 \times \text{fraction sunshine})$$

Measure the air temperature with standard thermometer. Estimate fraction of sunshine by judging what percent the sun is out; 100% sunshine - non cloud cover 1.0; 50% sunshine - 50% cloud cover - 0.5; 0% sunshine-full cloud cover - 0.0).

**APPENDIX B**

**EMPLOYEE CERTIFICATION**

**APPENDIX B**  
**EMPLOYEE CERTIFICATION**

By my signature, I certify that I have read, understand, and will abide by, the health and safety plan for the \_\_\_\_\_ site.

<u>Printed Name</u>	<u>Signature</u>	<u>Company</u>	<u>Date</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

## **APPENDIX C**

### **MATERIAL SAFETY DATA SHEETS**

# MALLINCKRODT

## Material Safety Data Sheet

Mallinckrodt, Inc. Science Products Division, P.O. Box M Paris, KY 40361

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Emergency Telephone Number: 314-982-5000

### NITRIC ACID 10% R.S.

#### PRODUCT IDENTIFICATION:

Synonyms: Aqua Fortis; Azotic Acid

Formula CAS No.: 7697-37-2

Molecular Weight: 63.01

Chemical Formula:  $\text{HNO}_3$  (10% solution)

Hazardous Ingredients: Nitric acid

#### PRECAUTIONARY MEASURES

**DANGER! CORROSIVE. OXIDIZER. CAUSES SEVERE BURNS.  
MAY BE FATAL IF SWALLOWED. HARMFUL IF INHALED.**

Do not get in eyes, on skin, or on clothing.  
Avoid breathing mist.

Use only with adequate ventilation.  
Wash thoroughly after handling.

Store in a tightly closed container.  
Remove and wash contaminated clothing promptly.

This substance is classified as a POISON under the Federal Caustic Poison Act.

#### EMERGENCY/FIRST AID

In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes. If swallowed, DO NOT INDUCE VOMITING!

Give large quantities of water or milk if available. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In all cases call a physician.

SEE SECTION 5.

DOT Hazard Class: Corrosive Material

#### SECTION 1 Physical Data

Appearance: Clear, colorless solution.

Odor: Odorless.

Solubility: Infinitely soluble in water.

Boiling Point: ca. 101°C (214°F)

Melting Point: ca. -3°C (27°F)

Specific Gravity: 1.41

Vapor Density (Air=1): No information found.

Vapor Pressure (mm Hg): No information found.

Evaporation Rate: No information found.

#### SECTION 2 Fire and Explosion Information

##### Fire:

Not combustible, but substance is an oxidizer and its heat of reaction with reducing agents or combustibles may cause ignition.

##### Explosion:

Contact with oxidizable substances may cause combustion.

##### Fire Extinguishing Media:

Water or water spray.

##### Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

#### SECTION 3 Reactivity Data

##### Stability:

Stable under ordinary conditions of use and storage.

##### Hazardous Decomposition Products:

When heated to decomposition, emits toxic nitrogen oxides fumes and hydrogen nitrate.

##### Hazardous Polymerization:

Will not occur.

##### Incompatibilities:

Strong bases, metallic powders, carbides, hydrogen sulfide, turpentine, and combustible organics.

#### SECTION 4 Leak/Spill Disposal Information

Ventilate and evacuate area. Clean-up personnel require protective clothing and respiratory protection from vapors. Allow only qualified personnel to handle the spill. Cover spill with sodium bicarbonate or soda ash and mix. Neutralized waste may be transferred to a closed, preferably metal, container and sent to a RCRA-approved waste disposal facility. Reportable Quantity (RQ)(CWA/CERCLA): 1000 lbs. nitric acid.

Ensure compliance with local, state and federal regulations.



# MALLINCKRODT

## Material Safety Data Sheet

Mallinckrodt, Inc. Science Products Division, P.O. Box M Paris, KY 40361

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Emergency Telephone Number: 314-982-5000

### Addendum to Material Safety Data Sheet

#### REGULATORY STATUS

#### This Addendum Must Not Be

#### Detached from the MSDS

#### Identifies SARA 313 substance(s)

#### Any copying or redistribution of the MSDS

#### must include a copy of this addendum

(Chem.Key: NITAC)

#### Hazard Categories for SARA Section 311/312 Reporting

Acute Chronic Fire Pressure Reactive

X

X

Product or Components  
of Product:

NITRIC ACID 10% R.S. (7697-37-2)

SARA EHS Sect. 302  
RQ (lbs.) TPQ (lbs.)

1000

1,000

SARA Section 313 Chemicals  
Name List Chemical Category

Yes

No

CERCLA Sec.103  
RQ (lbs.)

1000

RCRA  
Sec. 261.33

No

SARA Section 302 EHS RQ: Reportable Quantity of Extremely Hazardous Substance, listed at 40 CFR 355.

SARA Section 302 EHS TPQ: Threshold Planning Quantity of Extremely Hazardous Substance. An asterisk (\*) following a Threshold Planning Quantity signifies that if the material is a solid and has a particle size equal to or larger than 100 micrometers, the Threshold Planning Quantity = 10,000 LBS.

SARA Section 313 Chemicals: Toxic Substances subject to annual release reporting requirements listed at 40 CFR 372.65.

CERCLA Sec. 103: Comprehensive Environmental Response, Compensation and Liability Act (Superfund). Releases to air, land or water of these hazardous substances which exceed the Reportable Quantity (RQ) must be reported to the National Response Center, (800-424-8802); Listed at 40 CFR 302.4

RCRA: Resource Conservation and Reclamation Act. Commercial chemical product wastes designated as acute hazards and toxic under 40 CFR 261.33

Effective Date: 04-06-89 Supersedes 11-05-85

NITRIC ACID 10% R.S.

# MALLINCKRODT

## Material Safety Data Sheet

Mallinckrodt, Inc. Science Products Division, P.O. Box M Paris, KY 40361

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Emergency Telephone Number: 314-982-5000

## METHYL ALCOHOL

### PRODUCT IDENTIFICATION:

Synonyms: Wood alcohol; methanol; carbinol

Formula CAS No.: 67-56-1

Molecular Weight: 32.04

Chemical Formula: CH<sub>3</sub>OH

Hazardous Ingredients: Methyl alcohol

### PRECAUTIONARY MEASURES

DANGER! MAY BE FATAL IF SWALLOWED.  
HARMFUL IF INHALED. VAPOR HARMFUL. FLAMMABLE!  
MAY CAUSE BLINDNESS. CANNOT BE MADE NONPOISONOUS.  
CAUSES IRRITATION.

Keep away from heat, sparks and flame.  
Avoid breathing vapor.  
Keep container closed.  
Use with adequate ventilation.  
Wash thoroughly after handling.

### EMERGENCY/FIRST AID

In all cases call a physician immediately. If swallowed, induce vomiting immediately by giving two glasses of water and sticking finger down throat. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes.  
SEE SECTION 5.

DOT Hazard Class: Flammable Liquid

### SECTION 1 Physical Data

Appearance: Clear, colorless liquid.

Odor: Characteristic odor.

Solubility: Miscible with water.

Boiling Point: 64.5°C (148°F)

Melting Point: -98°C (-144°F)

Specific Gravity: 0.8

Vapor Density (Air=1): 1.1

Vapor Pressure (mm Hg): 97 @ 20°C (68°F)

Evaporation Rate: (BuAc=1): 5.9

### SECTION 2 Fire and Explosion Information

#### Fire:

Flammable. Flashpoint: 11°C (52°F) (CC).

Autoignition temperature: 385°C (725°F).

Flammable limits, in air, % by volume:

lcl = 6.7; ucl = 36.

#### Explosion:

Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Moderate explosion hazard and dangerous fire hazard when exposed to heat, sparks or flames.

#### Fire Extinguishing Media:

Water spray, dry chemical, alcohol foam, or carbon dioxide.

#### Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Use water spray to blanket fire, cool fire exposed containers, and to flush non-ignited spills or vapors away from fire. Vapors can flow along surfaces to distant ignition source and flash back.

### SECTION 3 Reactivity Data

#### Stability:

Stable under ordinary conditions of use and storage.

#### Hazardous Decomposition Products:

Carbon oxides and formaldehyde may form when heated to decomposition.

#### Hazardous Polymerization:

This substance does not polymerize.

#### Incompatibilities:

Strong oxidizing agents such as nitrates, perchlorates or sulfuric acid. Will attack some forms of plastics, rubber, and coatings. May react with metallic aluminium and generate hydrogen gas.

### SECTION 4 Leak/Spill Disposal Information

Ventilate area of leak or spill. Remove all sources of ignition. Clean-up personnel require protective clothing and respiratory protection from vapors. Contain and recover liquid when possible. Collect as hazardous waste and atomize in a suitable RCRA approved combustion chamber, or absorb with vermiculite, dry sand, earth or similar material for disposal as hazardous waste in a RCRA approved facility. Do not flush to sewer.

Reportable Quantity (RQ)(CWA/CERCLA): 5000 lbs.

Ensure compliance with local, state and federal regulations.

NFPA Ratings: Health: 1 Flammability: 3 Reactivity: 0

Effective Date: 04-06-89 Supersedes 05-01-86

METHYL ALCOHOL

AD

**SECTION 5 Health Hazard Information****A. EXPOSURE / HEALTH EFFECTS****Inhalation:**

A slight irritant to the mucous membranes. Toxic effects exerted upon nervous system, particularly the optic nerve. Once absorbed into the body, it is very slowly eliminated. Symptoms of overexposure may include headache, drowsiness, nausea, vomiting, blurred vision, blindness, coma, and death. A person may get better but then worse again up to 30 hours later.

**Ingestion:**

Toxic. Symptoms parallel inhalation. Can intoxicate and cause blindness. Usual fatal dose: 100-125 milliliters.

**Skin Contact:**

Methyl alcohol is a defatting agent and may cause skin to become dry and cracked. Skin absorption can occur; symptoms may parallel inhalation exposure.

**Eye Contact:**

Irritant. Continued exposure may cause eye lesions.

**Chronic Exposure:**

Marked impairment of vision and enlargement of the liver has been reported. Repeated or prolonged exposure may cause skin irritation.

**Aggravation of Pre-existing Conditions:**

Persons with pre-existing skin disorders or eye problems or impaired liver or kidney function may be more susceptible to the effects of the substance.

**B. FIRST AID****Inhalation:**

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

**Ingestion:**

If swallowed, induce vomiting immediately by giving two glasses of water and sticking finger down throat. Never give anything by mouth to an unconscious person. Call physician immediately.

**Skin Exposure:**

Remove any contaminated clothing. Wash skin with soap or mild detergent and water for at least 15 minutes. Get medical attention if irritation develops or persists.

**Eye Exposure:**

Wash eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

**C. TOXICITY DATA (RTECS, 1986)**

Oral rat LD50: 5628 mg/kg. Skin rabbit: 20 gm/kg. Aquatic toxicity rating TLM 96: Over 1,000. Mutation data cited. Reproductive effects data cited.

**SECTION 6 Occupational Control Measures****Airborne Exposure Limits:**

-OSHA Permissible Exposure Limit (PEL):  
200 ppm (TWA), 250 ppm (STEL) skin

-ACGIH Threshold Limit Value (TLV):  
200 ppm (TWA), 250 ppm (STEL) skin

**Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, "Industrial Ventilation, A Manual of Recommended Practices", most recent edition, for details.

**Personal Respirators: (NIOSH Approved)**

If the TLV is exceeded, wear a supplied air, full-facepiece respirator, airlined hood, or self-contained breathing apparatus.

**Skin Protection:**

Rubber or neoprene gloves and additional protection including impervious boots, apron, or coveralls, as needed in areas of unusual exposure.

**Eye Protection:**

Use chemical safety goggles. Contact lenses should not be worn when working with this material. Maintain eye wash fountain and quick-drench facilities in work area.

**SECTION 7 Storage and Special Information**

Protect against physical damage. Outside or detached storage is preferred. Inside storage should be in a standard flammable liquids storage room or cabinet. Separate from oxidizing materials. Storage and use areas should be No Smoking areas. Spark-proof tools and explosion-proof equipment should be used in the storage and handling area.

.....  
METOL





LIQUID AIR CORPORATION  
ALPHAGAZ DIVISION

ALPHAGAZ

Specialty Gas

## Material Safety Data Sheet

<b>LIQUID AIR CORPORATION</b> ALPHAGAZ DIVISION  California Plaza, Suite 350 2121 N. California Blvd. Walnut Creek, California 94596	<b>PRODUCT NAME</b> Hexanes plus Mixture	
	<b>TELEPHONE (415) 977-6500</b> <b>EMERGENCY RESPONSE INFORMATION ON PAGE 2</b>	
	<b>TRADE NAME AND SYNONYMS</b> See Last Page	<b>CAS NUMBER</b> See Last Pages
	<b>CHEMICAL NAME AND SYNONYMS</b> See Last Page	<b>NFPA 704 NUMBER (HFR)</b> 1 3 0
<b>ISSUE DATE</b> AUGUST 1, 1987 <b>AND REVISIONS</b> CORPORATE SAFETY DEPT.	<b>FORMULA</b> See Last Page	<b>MOLECULAR WEIGHT</b> See Last Page <b>CHEMICAL FAMILY</b> Liquid alkane mixture

### HEALTH HAZARD DATA (SEE NOTE ON LAST PAGE)

**TIME WEIGHTED AVERAGE EXPOSURE LIMIT** TWA's vary with the compounds in this mixture. See table in Note on last page. ACGIH data are 1986-87; OSHA data is 1985.

#### SYMPTOMS OF EXPOSURE

Exposure to the skin should cause irritation, redness and possible rash.  
Inhalation effects should include coughing, chest pains, and edema which could be fatal.  
Ingestion effects are gastrointestinal disturbances, nausea, headache and vomiting.

#### TOXICOLOGICAL PROPERTIES

Skin and mucous membrane exposure is as a simple irritant.  
Inhalation effects are similar to that of a simple asphyxiant. No long-term effects are known of breathing small quantities of these vapors.  
Ingestion effects are not fully understood. (See last pages)  
Typical toxicological data for animals follows:

(Continued on last pages)

Listed as Carcinogen  
or Potential Carcinogen

National Toxicology  
Program Yes ☐  
No ☒

I.A.R.C.  
Monographs Yes ☐  
No ☒

OSHA Yes ☐  
No ☒

#### RECOMMENDED FIRST AID TREATMENT

**PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO HEXANES PLUS MIXTURE.**

**Inhalation:** Conscious persons should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. Unconscious persons should be moved to an uncontaminated area, given mouth-to-mouth resuscitation and supplemental oxygen. Further treatment should be symptomatic and supportive.

**Skin or Eye Contact:** Flush affected area with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.

**Ingestion:** Induce vomiting to divest victim of what has been ingested.

## HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES

The vapors from this liquid as well as the liquid mixture is flammable in air.

## PHYSICAL DATA

BOILING POINT See Last Pages	LIQUID DENSITY AT BOILING POINT See Last Pages
VAPOR PRESSURE See Last Pages	GAS DENSITY AT 70°F 1 atm See Last Pages
SOLUBILITY IN WATER Very slightly	FREEZING POINT See Last Pages
APPEARANCE AND ODOR Colorless liquid and vapor with hydrocarbon odor.	

## FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED) Hexane = -7°F (-22°C)	AUTO IGNITION TEMPERATURE Unknown	FLAMMABLE LIMITS % BY VOLUME LEL .78% UEL = 7.7%
EXTINGUISHING MEDIA Water, dry chemical, carbon dioxide		ELECTRICAL CLASSIFICATION Class 1, Group not specified
SPECIAL FIRE FIGHTING PROCEDURES If possible, stop flow of hydrocarbon mixture. Use water spray to cool surrounding containers.		
UNUSUAL FIRE AND EXPLOSION HAZARDS None		

## REACTIVITY DATA

STABILITY Unstable		CONDITIONS TO AVOID
Stable	X	N/A
INCOMPATIBILITY (Materials to avoid) Oxygen, other oxidizers		
HAZARDOUS DECOMPOSITION PRODUCTS None		
HAZARDOUS POLYMERIZATION May Occur		CONDITIONS TO AVOID
Will Not Occur	X	N/A

## SPILL OR LEAK PROCEDURES

## STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Evacuate all personnel from affected area. Use appropriate protective equipment. If leak is in user's equipment, be certain to purge piping with an inert gas prior to attempting repairs. If leak is in container or container valve, contact your closest Liquid Air location or call the emergency telephone number listed herein.

WASTE DISPOSAL METHOD Do not attempt to dispose of waste or unused quantities. Return in the shipping container properly labeled, with any valve outlet plugs or caps secured and valve protection cap in place to your supplier. For emergency disposal assistance, contact your closest Liquid Air location or call the emergency telephone number listed herein.

## EMERGENCY RESPONSE INFORMATION

IN CASE OF EMERGENCY INVOLVING THIS MATERIAL, CALL DAY OR NIGHT (800) 231-1368

**SPECIAL PROTECTION INFORMATION**

<b>RESPIRATORY PROTECTION (Specify type)</b> Positive pressure air line with mask or self-contained breathing apparatus should be available for emergency use.		
<b>VENTILATION</b>	<b>LOCAL EXHAUST</b> To prevent accumulation above the LEL.	<b>SPECIAL</b>
Hood with forced ventilation	<b>MECHANICAL (Gen.)</b> In accordance with electrical codes.	<b>OTHER</b>
<b>PROTECTIVE GLOVES</b> Plastic or rubber		
<b>EYE PROTECTION</b> Safety goggles or glasses		
<b>OTHER PROTECTIVE EQUIPMENT</b> Safety shoes, safety shower, eyewash "fountain"		

**SPECIAL PRECAUTIONS\***

<b>SPECIAL LABELING INFORMATION</b>	
DOT Shipping Name: Liquefied petroleum gas	DOT Hazard Class: Flammable gas
DOT Shipping Label: Flammable gas	I.D. No.: UN 1075
<b>SPECIAL HANDLING RECOMMENDATIONS</b>	
Use only in well-ventilated areas. Valve protection caps must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure reducing regulator when connecting cylinder to lower pressure (<250 psig) piping or systems. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder.	
For additional handling recommendations consult L'Air Liquide's Encyclopedia de Gaz or Compressed Gas Association Pamphlet P-1.	
<b>SPECIAL STORAGE RECOMMENDATIONS</b>	
Protect cylinders from physical damage. Store in cool, dry, well-ventilated area of non-combustible construction away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 130F (54C). Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders being stored for excessive periods of time. Post "No Smoking or Open Flames" signs in the storage or use area. There should be no sources of ignition in the storage or use area.	
For additional storage recommendations consult L'Air Liquide's Encyclopedia de Gaz or Compressed Gas Association Pamphlet P-1.	
<b>SPECIAL PACKAGING RECOMMENDATIONS</b>	
Isobutylene is noncorrosive and may be used with any common structural material.	
<b>OTHER RECOMMENDATIONS OR PRECAUTIONS</b>	
Earth-ground and bond all lines and equipment associated with the isobutylene system. Electrical equipment should be non-sparking or explosion proof. Compressed gas cylinders should not be refilled except by qualified producers of compressed gases. Shipment of a compressed gas cylinder which has not been filled by the owner or with his (written) consent is a violation of Federal Law (49CFR).	

ADDITIONAL DATA

RECOMMENDED FIRST AID TREATMENT: (Continued)

with lukewarm water. DO NOT USE HOT WATER. A physician should see the patient promptly if the cryogenic "burn" has resulted in blistering of the dermal surface or deep tissue freezing.

TIME WEIGHTED AVERAGE EXPOSURE LIMIT (Continued)

TWA (OSHA, 1985) for LPG (Liquefied Petroleum Gas) is 1,000 molar PPM.

# Material Safety Data Sheet

<b>PRODUCT NAME</b> Isobutylene		<b>CAS NUMBER</b> 115-11-7
<b>TELEPHONE (415) 977-6500</b> <b>EMERGENCY RESPONSE INFORMATION ON PAGE 2</b>		
<b>TRADE NAME AND SYNONYMS</b> Isobutylene		<b>CHEMICAL FAMILY</b> Monoolefin
<b>CHEMICAL NAME AND SYNONYMS</b> Isobutene, Isobutylene, 2-Methylpropene		
<b>ISSUE DATE</b> OCTOBER 1, 1985 <b>AND REVISIONS</b> CORPORATE SAFETY DEPT.	<b>FORMULA</b> (iso) C <sub>4</sub> H <sub>8</sub>	<b>MOLECULAR WEIGHT</b> 56.03

See last page.

## HEALTH HAZARD DATA

**TIME WEIGHTED AVERAGE EXPOSURE LIMIT** Isobutylene is defined as a simple asphyxiant. Oxygen levels should be maintained at greater than 18 molar percent at normal atmospheric pressure which is equivalent to a partial pressure of 135 mm Hg. (ACGIH, 1984-85)

### SYMPTOMS OF EXPOSURE

**Inhalation:** Moderate concentrations so as to exclude an adequate supply of oxygen to the lungs causes dizziness, drowsiness and eventual unconsciousness. It also has a very mild anesthetic effect which might cause lack of co-ordination or lessened mental alertness.

**Skin and Eye Contact:** It is mildly irritating to mucous membranes. Due to its rapid rate of evaporation, it can cause tissue freezing or frostbite on dermal contact.

### TOXICOLOGICAL PROPERTIES

It has a very mild anesthetic effect; however, the major property is the exclusion of an adequate supply of oxygen to the lungs.

Frostbite effects are a change in color of the skin to gray or white possibly followed by blistering.

Listed as Carcinogen  
or Potential Carcinogen

National Toxicology  
Program Yes ☐  
No ☒

I.A.R.C.  
Monographs Yes ☐  
No ☒

OSHA Yes ☐  
No ☒

### RECOMMENDED FIRST AID TREATMENT

PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO ISOBUTYLENE. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS AND BE COGNIZANT OF EXTREME FIRE AND EXPLOSION HAZARD.

**Inhalation:** Conscious persons should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. Unconscious persons should be moved to an uncontaminated area, given mouth-to-mouth resuscitation and supplemental oxygen. Medical assistance should be sought immediately.

**Dermal Contact or Frostbite:** Remove contaminated clothing and flush affected areas  
(Continued on last page.)

## HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES

Isobutylene is flammable over a wide range in air.

## PHYSICAL DATA

BOILING POINT 19.18°F (-7.12°C)	LIQUID DENSITY AT BOILING POINT 39.09 lb/ft <sup>3</sup> (626.2 kg/m <sup>3</sup> )
VAPOR PRESSURE @ 70°F (21.1°C) = 38.43 psia (265 kPa)	GAS DENSITY AT 70°F 1 atm .148 lb/ft <sup>3</sup> (2.37 kg/m <sup>3</sup> )
SOLUBILITY IN WATER Insoluble	FREEZING POINT -220.63°F (-140.35°C)
APPEARANCE AND ODOR Colorless gas with an unpleasant odor similar to that which is emitted when burning anthracite coal. Specific gravity @70°F (Air = 1.0) is 1.98.	

## FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED) -105°F (-76°C) Closed cup	AUTO IGNITION TEMPERATURE 869°F (465°C)	FLAMMABLE LIMITS % BY VOLUME LEL: 1.8 UEL: 9.6
EXTINGUISHING MEDIA Water, carbon dioxide, dry chemical	ELECTRICAL CLASSIFICATION Class 1, Group not specified	
SPECIAL FIRE FIGHTING PROCEDURES If possible, stop the flow of isobutylene. Use water spray to cool surrounding containers.		
UNUSUAL FIRE AND EXPLOSION HAZARDS Isobutylene is heavier than air and may travel a considerable distance to a source of ignition. Should flame be extinguished and flow of gas continue, increase ventilation to prevent flammable mixture formation in low areas or pockets.		

## REACTIVITY DATA

STABILITY Unstable		CONDITIONS TO AVOID
Stable	X	
INCOMPATIBILITY (Materials to avoid) Oxidizers		
HAZARDOUS DECOMPOSITION PRODUCTS None		
HAZARDOUS POLYMERIZATION May Occur		CONDITIONS TO AVOID
Will Not Occur	X	

## SPILL OR LEAK PROCEDURES

## STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Evacuate all personnel from affected area. Use appropriate protective equipment. If leak is in user's equipment, be certain to purge piping with an inert gas prior to attempting repairs. If leak is in container or container valve, contact the closest Liquid Air Corporation location.

## WASTE DISPOSAL METHOD

Do not attempt to dispose of waste or unused quantities. Return in the shipping container properly labeled, with any valve outlet plugs or caps secured and valve protection cap in place to Liquid Air Corporation for proper disposal. For emergency disposal, contact the closest Liquid Air Corporation location.

## EMERGENCY RESPONSE INFORMATION

IN CASE OF EMERGENCY INVOLVING THIS MATERIAL, CALL DAY OR NIGHT (800) 231-1366  
OR CALL CHEMTREC AT (800) 424-9300

## SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type) Positive pressure air line with mask or self-contained breathing apparatus should be available for emergency use.		
VENTILATION	LOCAL EXHAUST To prevent accumulation above the TWA.	SPECIAL N/A
	MECHANICAL (Gen) In accordance with electrical codes	OTHER N/A
PROTECTIVE GLOVES Plastic or rubber		
EYE PROTECTION Safety goggles or glasses		
OTHER PROTECTIVE EQUIPMENT Safety shoes, safety shower, eyewash "fountain"		

## SPECIAL PRECAUTIONS\*

SPECIAL LABELING INFORMATION	
DOT Shipping Name: Flammable liquid, n.o.s.	DOT Hazard Class: Flammable liquid
DOT Shipping Label: Flammable liquid	DOT I.D. No.: UN 1993

## SPECIAL HANDLING RECOMMENDATIONS

This mixture is prepared in a special "piston" type cylinder which is designed to eliminate problems with fractionation changing the mix concentrations as the cylinder is emptied.

BE CERTAIN TO READ AND UNDERSTAND THE BROCHURE DESCRIBING THE ALPHAGAZ PISTON CYLINDER.

Use only in well ventilated areas.  
Close valve after each use and when empty.

For additional handling recommendations consult L'Air Liquide's Encyclopedia de Gaz or Compressed Gas Association Pamphlet P-1.

## SPECIAL STORAGE RECOMMENDATIONS

Store in cool, dry, well-ventilated area of non-combustible construction away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 130°F (54°C). Full and empty cylinders should be segregated. Use a "first in - first out" inventory system to prevent full cylinders being stored for excessive periods of time. Post "No Smoking or Open Flames" signs in the storage or use area. There should be no source of ignition in the storage or use area.

For additional storage recommendations consult L'Air Liquide's Encyclopedia de Gaz or Compressed Gas Association Pamphlet P-1.

## SPECIAL PACKAGING RECOMMENDATIONS

This hydrocarbon mixture is noncorrosive and may be used with any common structural material.

## OTHER RECOMMENDATIONS OR PRECAUTIONS

Earth-ground and bond all lines and equipment associated with this hydrocarbon mixture. Electrical equipment should be non-sparking or explosion proof. Compressed gas cylinders should not be refilled except by qualified producers of compressed gases. Impment of a compressed gas cylinder which has not been filled by the owner or with ...s (written) consent is a violation of Federal Law (49CFR).

NEVER transport cylinders in trunks of vehicles,

(Continued on last pages)

## ADDITIONAL DATA

TRADE NAME AND SYNONYMS: Hexanes plus mixture; Liquid hydrocarbon mixture.

CHEMICAL NAME AND SYNONYMS: Hexane, heptane, Octane, nonane, and decane mixture.

FORMULA:  $C_6H_{14}$ ,  $C_7H_{16}$ ,  $C_8H_{18}$ ,  $C_9H_{20}$  and  $C_{10}H_{22}$  Mixture.

MOLECULAR WEIGHT: for

Hexane	=	86.17
Heptane	=	100.20
Octane	=	114.22
Nonane	=	128.25
Decane	=	142.28

CAS NUMBER: for

Hexane	=	110-54-3
Heptane	=	142-82-5
Octane	=	111-65-9
Nonane	=	111-84-2
Decane	=	124-18-5

HEALTH HAZARD DATA: NOTE - Much of the health hazard data for the materials in this mixture varies from compound to compound. The following table identifies the hazards and toxic data associated with each compound in the mixture.

Compound	ACGIH TWA	ACGIH STEL	OSHA TWA	Skin Absorption Hazard	Ingestion Hazard
	(Molar PPM)				
n-Hexane	50	None	500	Yes	Yes
Hexane (Isomers)	500	1,000	Not Listed	Unknown	Unknown
n-Heptane	400	500	500	No	Yes
n-Octane	300	375	500	No	Yes
n-Nonane	200	None	Not listed	Yes	Yes
n-Decane	Not listed		Not listed	Unknown	Yes

## TOXICOLOGICAL PROPERTIES: (Continued)

Decane: LC50 (Mouse) inhalation = 72,300 mg/m<sup>3</sup> for 2 hours.  
 Nonane: LC50 (Rat) inhalation = 3200 PPM for 4 hours.  
 Nonane: LD50 (Intravenous-Mouse) = 218 mg/kg.  
 Heptane: TCLO (Inhalation-Human) = 1000 PPM for 6 minutes.  
 Heptane: LD50 (Intravenous-Mouse) = 222 mg/kg.  
 Hexane: TCL<sub>0</sub> (Inhalation-Human) = 5,000 PPM for 10 minutes.  
 Hexane: LD50 (Oral dosage, rat) = 28,710 mg/kg.

None of the compounds in this mixture are listed in the IARC, NTP or by OSHA as a carcinogen or a potential carcinogen.



## Hexanes plus Mixture

## ADDITIONAL DATA

BOILING POINT:	N-C <sub>6</sub>	=	155.7°F (68.7°C)
	N-C <sub>7</sub>	=	209.2°F (98.4°C)
	N-C <sub>8</sub>	=	258.2°F (125.7°C)
	N-C <sub>9</sub>	=	303.4°F (150.8°C)
	N-C <sub>10</sub>	=	345.4°F (174.1°C)

## LIQUID DENSITY AT BOILING POINT: @ 60°F (15.6°C) and 1 atmosphere

	N-C <sub>6</sub>	=	41.34 lb/ft <sup>3</sup> (662.2 kg/m <sup>3</sup> )
	N-C <sub>7</sub>	=	42.85 lb/ft <sup>3</sup> (686.4 kg/m <sup>3</sup> )
	N-C <sub>8</sub>	=	44.01 lb/ft <sup>3</sup> (704.9 kg/m <sup>3</sup> )
	N-C <sub>9</sub>	=	44.94 lb/ft <sup>3</sup> (719.9 kg/m <sup>3</sup> )
	N-C <sub>10</sub>	=	45.72 lb/ft <sup>3</sup> (732.4 kg/m <sup>3</sup> )

## VAPOR PRESSURE: @ 100°F (37.8°C)

	N-C <sub>6</sub>	=	4.96 psia (34.20 kPa)
	N-C <sub>7</sub>	=	1.62 psia (11.17 kPa)
	N-C <sub>8</sub>	=	0.537 psia (3.70 kPa)
	N-C <sub>9</sub>	=	0.179 psia (1.23 kPa)
	N-C <sub>10</sub>	=	0.073 psia (0.503 kPa)

## VAPOR DENSITY: (@ Boiling Point)

	N-C <sub>6</sub>	=	.2002 lb/ft <sup>3</sup> (3.206 kg/m <sup>3</sup> )
	N-C <sub>7</sub>	=	.2143 lb/ft <sup>3</sup> (3.434 kg/m <sup>3</sup> )
	N-C <sub>8</sub>	=	.2284 lb/ft <sup>3</sup> (3.659 kg/m <sup>3</sup> )
	N-C <sub>9</sub>	=	.2418 lb/ft <sup>3</sup> (3.873 kg/m <sup>3</sup> )
	N-C <sub>10</sub>	=	.2542 lb/ft <sup>3</sup> (4.072 kg/m <sup>3</sup> )

## FREEZING POINT:

	N-C <sub>6</sub>	=	-139.6°F (-95.33°C)
	N-C <sub>7</sub>	=	-131.1°F (-90.61°C)
	N-C <sub>8</sub>	=	-70.2°F (-56.8°C)
	N-C <sub>9</sub>	=	-64.3°F (-53.5°C)
	N-C <sub>10</sub>	=	-21.4°F (-29.7°C)

OTHER RECOMMENDATIONS OR PRECAUTIONS: (Continued) enclosed vans, truck cabs or in passenger compartments. Transport cylinders secured in open flatbed or in open pick-up type vehicles.

# Material Safety Data Sheet

PRODUCT NAME <b>Methane</b>		CAS NUMBER <b>74-82-8</b>
TELEPHONE (415) 977-6500 EMERGENCY RESPONSE INFORMATION ON PAGE 2		
TRADE NAME AND SYNONYMS <b>Methane</b>		CHEMICAL FAMILY <b>Aliphatic Hydrocarbon</b>
CHEMICAL NAME AND SYNONYMS <b>Methane, Methyl Hydride, Marsh Gas</b>		
ISSUE DATE OCTOBER 1, 1985 AND REVISIONS CORPORATE SAFETY DEPT.	FORMULA <b>CH<sub>4</sub></b>	MOLECULAR WEIGHT <b>16.01</b>

## HEALTH HAZARD DATA

**TIME WEIGHTED AVERAGE EXPOSURE LIMIT** Methane is defined as a simple asphyxiant. Oxygen levels should be maintained at greater than 18 molar percent at normal atmospheric pressure which is equivalent to a partial pressure of 135 mm Hg. (ACGIH, 1984-85)

### SYMPTOMS OF EXPOSURE

**Inhalation:** High concentrations of methane so as to exclude an adequate supply of oxygen to the lungs causes dizziness, deeper breathing due to air hunger, possible nausea and eventual unconsciousness.

**Skin Contact:** Contact with cryogenic liquid methane causes cryogenic "burns" or frostbite of dermal tissue.

### TOXICOLOGICAL PROPERTIES

Methane is inactive biologically and essentially nontoxic; therefore, the major property is the exclusion of an adequate supply of oxygen to the lungs.

Frostbite effects are a change in color of the skin to gray or white possibly followed by blistering.

Listed as Carcinogen  
or Potential Carcinogen

National Toxicology  
Program

Yes ☐  
No ☒

I.A.R.C.  
Monographs

Yes ☐  
No ☒

OSHA Yes ☐  
No ☒

### RECOMMENDED FIRST AID TREATMENT

**PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO METHANE. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS AND BE COGNIZANT OF EXTREME FIRE AND EXPLOSION HAZARD.**

**Inhalation:** Conscious persons should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. Unconscious persons should be moved to an uncontaminated area, given mouth-to-mouth resuscitation and supplemental oxygen. Medical assistance should be sought immediately.

**Dermal Contact or Frostbite:** Remove contaminated clothing and flush affected areas with lukewarm water. DO NOT USE HOT WATER. (Continued on last page.)

**HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES**

is explosive or flammable mixtures with most oxidizers (oxygen, chlorine, fluorine, etc.)

Is flammable over a wide range in air.

**PHYSICAL DATA**

BOILING POINT -258.74°F (-161.52°C)	LIQUID DENSITY AT BOILING POINT 26.383 lb/ft <sup>3</sup> (422.62 kg/m <sup>3</sup> )
VAPOR PRESSURE @ 70°F (21.1°C) Above the critical temperature of -116.7°F (-82.62°C)	GAS DENSITY AT 70°F 1 atm .041 lb/ft <sup>3</sup> (.657 kg/m <sup>3</sup> )
SOLUBILITY IN WATER @ 68°F (20°C) Bunsen Coefficient = .035	FREEZING POINT -296.45°F (-182.47°C)
APPEARANCE AND ODOR Colorless, odorless gas, liquid is water white.	Specific gravity @70°F (Air = 1.0) is .55.

**FIRE AND EXPLOSION HAZARD DATA**

FLASH POINT (METHOD USED)-306°F (-188°C) Closed Cup	AUTO IGNITION TEMPERATURE 1076°F (580°C)	FLAMMABLE LIMITS % BY VOLUME LEL=5 UEL=15
EXTINGUISHING MEDIA Water, carbon dioxide, dry chemical		ELECTRICAL CLASSIFICATION Class 1, Group D
SPECIAL FIRE FIGHTING PROCEDURES If possible, stop the flow of methane. Use water spray to cool surrounding containers.		
ADDITIONAL FIRE AND EXPLOSION HAZARDS Should flame be extinguished and flow of gas continue, increase ventilation to prevent flammable or explosible mixture formation.		

**REACTIVITY DATA**

STABILITY Unstable		CONDITIONS TO AVOID
Stable	X	
INCOMPATIBILITY (Materials to avoid) Oxidizers		
HAZARDOUS DECOMPOSITION PRODUCTS None		
HAZARDOUS POLYMERIZATION May Occur		CONDITIONS TO AVOID
Will Not Occur	X	

**SPILL OR LEAK PROCEDURES****STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED**

Evacuate all personnel from affected area. Use appropriate protective equipment. If leak is in user's equipment, be certain to purge piping with an inert gas prior to attempting repairs. If leak is in container or container valve, contact the closest Liquid Air Corporation location.

**W. DISPOSAL METHOD**

Do not attempt to dispose of waste or unused quantities. Return in the shipping container properly labeled, with any valve outlet plugs or caps secured and valve protection cap in place to Liquid Air Corporation for proper disposal. For emergency disposal, contact the closest Liquid Air Corporation location.

## SPECIAL PROTECTION INFORMATION

<b>RESPIRATORY PROTECTION (Specify type)</b> Positive pressure air line with mask or self-contained breathing apparatus should be available for emergency use.		
<b>VENTILATION</b>  Hood with forced ventilation	<b>LOCAL EXHAUST</b> To prevent accumulation above the LEL.  <b>MECHANICAL (Gen.)</b> In accordance with electrical codes.	<b>SPECIAL</b>  <b>OTHER</b>
<b>PROTECTIVE GLOVES</b> Plastic or rubber		
<b>EYE PROTECTION</b> Safety goggles or glasses		
<b>OTHER PROTECTIVE EQUIPMENT</b> Safety shoes, safety shower, eyewash "fountain"		

## SPECIAL PRECAUTIONS\*

<b>SPECIAL LABELING INFORMATION</b> (Note: For cryogenic liquid methane, see last page.) DOT Shipping Name: Methane      DOT Hazard Class: Flammable Gas DOT Shipping Label: Flammable Gas      ID No.: UN 1971	
<b>SPECIAL HANDLING RECOMMENDATIONS</b> Use only in well-ventilated areas. Valve protection caps must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure reducing regulator when connecting cylinder to lower pressure (<3,000 psig) piping or systems. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder.	

For additional handling recommendations consult L'Air Liquide's Encyclopedia de Gaz or Compressed Gas Association Pamphlet P-1.

<b>SPECIAL STORAGE RECOMMENDATIONS</b> Protect cylinders from physical damage. Store in cool, dry, well-ventilated area of non-combustible construction away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 130F (54C). Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders being stored for excessive periods of time. Post "No Smoking or Open Flames" signs in the storage or use area. There should be no sources of ignition in the storage or use area.
---

For additional storage recommendations consult L'Air Liquide's Encyclopedia de Gaz or Compressed Gas Association Pamphlet P-1.

<b>SPECIAL PACKAGING RECOMMENDATIONS</b>  Methane is noncorrosive and may be used with any common structural material.
--

<b>OTHER RECOMMENDATIONS OR PRECAUTIONS</b> Earth-ground and bond all lines and equipment associated with the methane system. Electrical equipment should be non-sparking or explosion proof. Compressed gas cylinders should not be refilled except by qualified producers of compressed gases. Shipment of a compressed gas cylinder which has not been filled by the owner or with his (written) consent is a violation of Federal Law (49CFR).
---

**ADDITIONAL DATA**

**RECOMMENDED FIRST AID TREATMENT: (Continued)**

A physician should see the patient promptly if the cryogenic "burn" has resulted in blistering of the dermal surface or deep tissue freezing.

**SPECIAL LABELING INFORMATION: (Continued)**

**cryogenic liquid methane:**

DOT Shipping Name: Methane, refrigerated liquid  
DOT Shipping Label: Flammable gas  
DOT Hazard Class: Flammable gas  
I.D. No.: UN 1972

## **APPENDIX D**

### **HAZARDOUS MATERIALS EXPOSURE REPORT**

Project #: \_\_\_\_\_

## HAZARDOUS MATERIALS EXPOSURE REPORT

Dates on Site: \_\_\_\_\_ - \_\_\_\_\_

Name of Employee: \_\_\_\_\_  
Last First Initial

Project No.	Site Name/ Location	Activity	Duration on the Site (Days/Hours)	Chemical or Other Materials Present
-------------	------------------------	----------	---	---

If you believe you had a possible or actual exposure or injury, complete the following:

Date/Time of Exposure Type of Exposure Duration of Exposure

Date/Time of Injury Type of Injury

Date/Time of Notification of Injury Individuals Notified

\_\_\_\_\_  
Employee Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Regional Safety Coordinator Signature

\_\_\_\_\_  
Date

## **APPENDIX E**

### **SITE SAFETY PLAN AMENDMENTS**



Project #: \_\_\_\_\_

## SITE SAFETY PLAN AMENDMENT

Amendment # 001 \_\_\_\_\_

Site Name: Phoenix-Goodyear Airport

Project # 006791-0001-001

Date: 19 August 91

Type of Amendment: Addition of new task

Reason for Amendment: A new task involving the installation of eight clusters of monitoring wells at the site was added. The new task will be completed in conjunction with work already progressing at the site.

Additional Required Changes in Other H&S Procedures: \_\_\_\_\_

Comments: The new tasks of installing monitoring wells has been incorporated into the text of the existing HSP. These areas have been marked with an asterisk (\*).

Required Changes in PPE: \_\_\_\_\_

\_\_\_\_\_  
Regional Health & Safety Coordinator

\_\_\_\_\_  
Date

\_\_\_\_\_  
TES X Health & Safety Manager

**APPENDIX B**  
**CONSENT DECREE**

1  
2 IN THE UNITED STATES DISTRICT COURT  
3 FOR THE DISTRICT OF ARIZONA  
4 PHOENIX DIVISION

5 UNITED STATES OF AMERICA,  
6 STATE OF ARIZONA  
7 Plaintiffs,

8 v.

9 THE GOODYEAR TIRE & RUBBER COMPANY,  
10 LORAL DEFENSE SYSTEMS-ARIZONA, A  
11 DIVISION OF LORAL CORPORATION.

12 Defendants.

CIVIL ACTION NO.

CONSENT DECREE

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1  
2 WHEREAS, the United States of America ("United States"), on  
3 behalf of the Administrator of the United States Environmental  
4 Protection Agency ("EPA"), and the State of Arizona ("State"), have  
5 filed a Complaint in this matter pursuant to the Comprehensive  
6 Environmental Response, Compensation, and Liability Act ("CERCLA"),  
7 42 U.S.C. Section 9601 et seq., as amended by the Superfund  
8 Amendments and Reauthorization Action of 1986, Pub. L. No. 99-499,  
9 100 Stat. 1613 (1986) ("SARA"), and Titles 45 and 49 of the Arizona  
10 Revised Statutes, to compel Defendants The Goodyear Tire & Rubber  
11 Company ("Goodyear") and Loral Defense Systems-Arizona, a division  
12 of Loral Corporation ("Loral"), to perform remedial actions and to  
13 pay all response costs that have been and will be incurred by the  
14 United States and the State in response to releases and threatened  
15 releases of hazardous substances from a facility known as the  
16 Phoenix-Goodyear Airport ("PGA") Superfund Site located in  
17 Goodyear, Arizona.

18 WHEREAS, the United States and the State allege that releases  
19 of hazardous substances, including trichloroethylene ("TCE"), have  
20 occurred at this Site and that Defendants are liable parties  
21 pursuant to Section 107(a) of CERCLA, 42 U.S.C. Section 9607(a).

22 WHEREAS, in 1983, EPA listed the Phoenix-Goodyear Airport  
23 Superfund Site on the National Priorities List ("NPL") for  
24 appropriate response actions pursuant to CERCLA, by publication in  
25 the Federal Register on September 8, 1983 (48 Fed. Reg. 40658).



1 WHEREAS, the State has reviewed the 1989 ROD and has concurred  
2 with EPA's decision.

3 WHEREAS, by letter dated March 2, 1990, pursuant to Section  
4 122(e) of CERCLA, 42 U.S.C. Section 9622(e), EPA notified Goodyear,  
5 Loral, the Department of Defense, and the City of Phoenix of their  
6 potential liability as potentially responsible parties ("PRPs") to  
7 the United States for response costs incurred and to be incurred  
8 by EPA at the Site and for future response actions required to  
9 carry out the final remedial action.

10 WHEREAS, Defendants Goodyear and Loral have responded to the  
11 March 2, 1990 letter from EPA and are the only PRP who has agreed  
12 to undertake all of the Work.

13 WHEREAS, pursuant to Section 122 of CERCLA, 42 U.S.C.  
14 Section 9622, Defendants, the United States, and the State have  
15 stipulated and agreed to the making and entry of this Consent  
16 Decree prior to the taking of any testimony, based upon the  
17 pleadings herein, without any admission of liability or fault as  
18 to any allegation or matter arising out of the pleadings of any  
19 party or otherwise.

20 WHEREAS, Defendants, the United States, and the State agree  
21 that settlement of this matter and entry of this Consent Decree is  
22 made in good faith in an effort to avoid further expensive and  
23 protracted litigation, without an admission as to liability for any  
24 purpose.

25 NOW THEREFORE, it is ORDERED, ADJUDGED, AND DECREED as  
26 follows:  
27  
28



1 I. JURISDICTION

2 The Court has jurisdiction over the subject matter of this  
3 action and the signatories to this Consent Decree pursuant to  
4 Sections 106, 107, 113 and 122 of CERCLA, 42 U.S.C. Sections 9606,  
5 9607, 9613 and 9622, and 28 U.S.C. Sections 1331 and 1345. The  
6 parties to this Decree shall not challenge the Court's jurisdiction  
7 to enter and enforce this Consent Decree.

8 II. PARTIES

9 The parties to this Consent Decree are: the United States of  
10 America, on behalf of the Environmental Protection Agency, the  
11 State of Arizona, The Goodyear Tire & Rubber Company, and Loral  
12 Defense Systems-Arizona, a division of Loral Corporation.

13 III. BINDING EFFECT

14 A. This Consent Decree shall apply to and be binding upon  
15 the Defendants, their officers, directors, employees, agents,  
16 successors, and assigns. No change in ownership or corporate or  
17 partnership status will in any way alter Defendants'  
18 responsibilities under this Consent Decree. Defendants shall  
19 provide all relevant additions to this Consent Decree to all prime  
20 contractors retained to perform the Work (as defined below) within  
21 thirty (30) days of retainer, and shall condition any contract for  
22 the Work on compliance with this Consent Decree. Defendants shall  
23 advise all other persons retained to perform the Work, including  
24 subcontractors, of this Consent Decree and shall provide a copy of  
25 this Consent Decree to such persons upon request.

1 B. Defendants shall implement the Work as that term is  
2 defined in this Consent Decree.

3 IV. DEFINITIONS

4 Unless otherwise expressly provided herein, terms used in this  
5 Consent Decree which are defined in CERCLA or the National  
6 Contingency Plan ("NCP"), 40 C.F.R. Part 300, shall have the  
7 meaning assigned to them under such statute or regulation as of the  
8 date this Consent Decree is entered by the Court. The following  
9 terms used in this Consent Decree are defined as follows:

10 1. "ARARS" means all "applicable or relevant and appropriate"  
11 Federal and State environmental requirements as required by Section  
12 121(d) of CERCLA, 42 U.S.C. Section 9621(d).

13 2. "Clean-up Standards" means: 1) the numerical  
14 groundwater clean-up levels identified in Table 2-5 of the 1989  
15 ROD which are applicable to Subunit A and Subunit B/C groundwater;  
16 (2) the numerical Subunit A groundwater clean-up levels identified  
17 in Table 1 of the 1987 ROD and 3) the mass of VOCs in the vadose  
18 zone (per sub-area of the SVE target area) that shall not cause VOC  
19 concentrations in Subunit A groundwater to exceed the groundwater  
20 clean-up levels identified in Table 2-5 of the 1989 ROD (based upon  
21 application of the VLEACH model or similarly EPA-approved vadose  
22 zone model).

23 3. "1988 Consent Decree" means the consent decree between the  
24 United States, and The Goodyear Tire & Rubber Company entered by  
25 this Court on October 31, 1988.

1        4. "1990 Consent Decree" means the consent decree between the  
2 United States, the State of Arizona, Goodyear, and Loral for the  
3 Work, as defined herein (also referred to as "this Consent Decree"  
4 or "this Decree").

5        5. "CERCLA" means the Comprehensive Environmental Response,  
6 Compensation, and Liability Act of 1980, 42 U.S.C. Section 9601,  
7 et seq., as amended by the Superfund Amendments and Reauthorization  
8 Act of 1986) ("SARA"), Pub. L. 99-499, 101 Stat. 1613 (1986).

9        6. "Day" shall mean a calendar day unless expressly stated  
10 to be a working day; however, should a deadline fall on a weekend  
11 or a Federal holiday, the deadline will be construed to continue  
12 to the next working day. "Working day" shall mean a day other than  
13 a Saturday, Sunday, or Federal holiday.

14        7. "EPA" means the United States Environmental Protection  
15 Agency.

16        8. "Groundwater Remedy" means the groundwater extraction,  
17 treatment, and any related conveyance facilities used for the  
18 remedy of the Subunit B/C aquifer.

19        9. "National Contingency Plan" or "NCP," means the plan  
20 promulgated pursuant to Section 105 of CERCLA, published at 55 Fed.  
21 Reg. 8666 (1990) (effective April 9, 1990), and codified at 40  
22 C.F.R. Part 300, including any amendments thereto.

23        10. "National Priorities List" or "NPL" means the list  
24 established pursuant to Section 105 of CERCLA, 42 U.S.C. Section  
25 9605.

26

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1        11. "Operable Unit Remedy" means the remedial action for  
2 Subunit A groundwater at the Site as described by the 1987 ROD and  
3 the 1988 Consent Decree as incorporated into this Consent Decree.

4        12. "Operation and Maintenance" or "O&M" shall mean all  
5 activities required under the Operation and Maintenance Plans  
6 approved by EPA pursuant to this Consent Decree.

7        13. "Oversight" means the United States' and the State's  
8 inspection of remedial work and all actions necessary to verify the  
9 adequacy of performance of activities and reports of Defendants  
10 required under the terms of this Consent Decree.

11       14. "Phoenix-Goodyear Airport Superfund Site" means the PGA  
12 Study Area Boundary as identified in Figure 1-1 of the 1989 ROD.

13       15. "1987 Record of Decision" ("1987 ROD") means the Record  
14 of Decision for the Operable Unit Remedy at the Site, signed by the  
15 Regional Administrator of EPA Region IX on September 29, 1987.

16       16. "1989 Record of Decision" ("1989 ROD") means the Record  
17 of Decision for the Site issued by the Regional Administrator of  
18 EPA Region IX on September 26, 1989, attached hereto as Appendix  
19 A.

20       17. "RCRA" means the Solid Waste Disposal Act, as amended by  
21 the Resource Conservation and Recovery Act, 42 U.S.C. Section 6901;  
22 et seq.

23       18. "Response costs" means those costs incurred by the United  
24 States or the State pursuant to CERCLA, not inconsistent with the  
25 NCP, and shall include but are not limited to all oversight,  
26 administrative, enforcement, removal, investigative and remedial  
27  
28

1 or other direct or indirect costs related to the Site.

2 19. "Routine Operations" for a given component of the Work  
3 means the period of time under which the Work is being operated and  
4 maintained pursuant to a final, EPA-approved O&M Plan and continues  
5 until termination of the Consent Decree. A separate period for  
6 commencement of Routine Operations shall be calculated for each  
7 component of the Work.

8 20. "Site" means that area south of Yuma road within the  
9 Phoenix-Goodyear Airport Superfund Site in Goodyear, Arizona and  
10 areas with contamination exceeding ARARs attributable to disposal  
11 of hazardous substances south of Yuma Road.

12 21. "State" means the Arizona Department of Environmental  
13 Quality and the Arizona Department of Water Resources.

14 22. "United States" means the United States Environmental  
15 Protection Agency ("EPA") and the Department of Justice acting on  
16 behalf of the EPA.

17 23. "Work" means: 1) the design, construction, operation, and  
18 maintenance of the Subunit B/C groundwater extraction, treatment,  
19 and end-use conveyance system to meet Clean-Up Standards; 2) the  
20 design, construction, operation, and maintenance of the soil vapor  
21 extraction unit equipped with vapor controls; 3) the operation and  
22 maintenance of the Subunit A groundwater extraction, treatment, and  
23 end-use conveyance system (which may include reinjection) in  
24 accordance with the Operation and Maintenance Plan approved by EPA  
25 under the 1988 Consent Decree; and (4) all other tasks to be  
26 performed by Defendants pursuant to Section VII (Work to be  
27  
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1 Performed) of this Consent Decree, as may be modified pursuant to  
2 the provisions of this Consent Decree, and any schedule or plans  
3 required to be submitted pursuant thereto.

4 V. PURPOSE

5 The purpose of this Consent Decree is to protect the public  
6 health, welfare, and the environment from releases and threatened  
7 releases of hazardous substances at the Site that may be remediated  
8 by implementation of the response actions required by this Consent  
9 Decree.

10 VI. OBLIGATIONS FOR THE WORK

11 A. Defendants shall finance and perform, at their expense,  
12 the implementation of the Work. When submitting work plans as part  
13 of the requirements of this Decree, Defendants may propose to use,  
14 or propose to incorporate, work they have already conducted. EPA  
15 will review such work and to the extent that EPA determines it is  
16 acceptable, such work will be incorporated, as appropriate, into  
17 Defendants' submissions under this Decree.

18 B. Notwithstanding any approvals which may be granted by  
19 the United States, the State, or other governmental entities, the  
20 parties agree that no warranty of any kind is provided by the  
21 United States or the State as to the efficacy of the Work.

22 C. Defendants shall design, implement, and complete the Work  
23 in accordance with the NCP, and all amendments thereto that are  
24 effective and applicable to any activity undertaken pursuant to  
25 this Consent Decree, and also in accordance with the standards,  
26 specifications, and schedule of completion set forth in or approved  
27  
28

1 by EPA pursuant to Paragraph VII (Work to be Performed) of this  
2 Consent Decree. By entry of this Decree, the Court finds and the  
3 parties agree that the 1989 ROD and the Work, as set forth in this  
4 Consent Decree, are not inconsistent with the NCP.

5 D. Defendants shall appoint a representative (the "Project  
6 Coordinator") to act on its behalf to execute the Work, pursuant  
7 to Section XIII (Project Coordinators) of this Decree.

8 E. In the event EPA determines that Defendants have  
9 materially failed to implement the Work or any portions thereof in  
10 a timely or adequate manner, EPA or its designate may perform all  
11 or portions of the Work as EPA determines to be necessary. If  
12 EPA performs all or portions of the Work because of Defendants'  
13 failure to comply with their obligations under this Consent Decree,  
14 Defendants shall reimburse the EPA for the response costs incurred  
15 by doing such work that are not inconsistent with the NCP, plus  
16 penalties as set forth in Section XXVI (Stipulated Penalties).  
17 Prior to such assumption, EPA will provide Defendants with advance  
18 notice thereof, and, to the extent practicable, the opportunity for  
19 consultation regarding EPA's intention to perform a portion of or  
20 all of the Work. In the absence of an emergency condition, EPA  
21 will provide Defendants' Project Coordinator with fifteen (15) days  
22 advance notice. During such fifteen (15) day period, EPA will meet  
23 with Defendants' Project Coordinator and attempt to resolve the  
24 issues of concern.

25 F. Subject to the provisions of Subparagraph G below, all  
26 activities undertaken by Defendants pursuant to this Consent Decree  
27

1 shall be undertaken in accordance with the substantive requirements  
2 of Title 45 or the substantive permitting requirements of Title 45  
3 of the Arizona Revised Statutes, including but not limited to  
4 A.R.S. Sections 45-492, 45-494, 45-562, 45-563, 45-564, 45-565, 45-  
5 566, 45-567, 45-568, 45-594, 45-595, 45-602, and 45-604, as well  
6 as with the requirements of all other applicable State, local, and  
7 Federal laws, regulations, the 1989 ROD, and all ARARS. EPA has  
8 determined that the obligations and procedures authorized under  
9 this Consent Decree are consistent with its authority under  
10 applicable law.

11 G. Pursuant to Section 121(e) of CERCLA, 42 U.S.C. Section  
12 9621(e), no Federal, State, or local permits shall be required for  
13 the portion of any removal or remedial action conducted entirely  
14 on-site, where such remedial action is selected and carried out in  
15 compliance with 42 U.S.C. Section 9621. Provided however, that if  
16 the State issues permits in a timely manner, Defendants shall  
17 obtain and comply with State permits required under Title 45 of the  
18 Arizona Revised Statutes. This Consent Decree is not, and shall  
19 not be construed to be, a permit issued pursuant to any Federal or  
20 State statute or regulation.

21 H. Defendants shall require, as a condition applying to any  
22 water that may be delivered off-site as part of the end-use  
23 conveyance system portion of the Work, that the recipient commit  
24 to disposition of the water in accordance with applicable Arizona  
25 water laws, regulations and management plans.



VII. WORK TO BE PERFORMED

A. Defendants shall perform all work necessary to implement the remedial action as defined by EPA's 1989 ROD regarding the Site and further defined in this Consent Decree. The 1989 ROD is hereby incorporated into this Consent Decree. All obligations of this Section shall be effective upon entry of this Consent Decree.

B. All Work shall be performed by qualified employees or contractors of Defendants in accordance with the schedule in Subparagraph D. below. Defendants' selection of any prime contractors shall be subject to EPA approval. If at any time thereafter Defendants propose to change their prime contractors, Defendants shall give written notice to EPA and shall obtain approval from EPA before the new prime contractors perform any work under this Consent Decree. Defendants remain responsible for achievement of the Clean-up Standards. Nothing in this Consent Decree, or in EPA's approval of Defendants' prime contractors or submissions, shall be deemed to constitute a warranty or representation of any kind by EPA that full performance of the Work will achieve the Clean-up Standards.

C. Requirements for the Work:

1. The Work consists of:

a) the design, construction, operation, and maintenance of a groundwater extraction system to hydraulically contain, in combination with the twenty (20) existing production wells identified in Table 8-1 Volume II of the Remedial Investigation Feasibility Study for the Site dated June 5, 1989, the hazardous

1 substances in Subunit B/C groundwater defined in Table 2-5 of the  
2 1989 ROD exceeding Clean-up Standards.

3 b) the design, construction, operation, and main-  
4 tenance of a water treatment system to treat the extracted Subunit  
5 B/C groundwater to meet Clean-up Standards at the following  
6 sampling points:

7 i) for agricultural use, at point of delivery to  
8 third party;

9 ii) for municipal use, at treatment plant discharge  
10 or point of delivery;

11 iii) for groundwater reinjection, at treatment plant  
12 discharge;

13 iv) for all other end-uses, at point of delivery as  
14 designated by EPA.

15 c) the design, construction, operation, and main-  
16 tenance of an end-use conveyance system for the treated water from  
17 the treatment plant that delivers the water for one or more  
18 beneficial uses as approved by the State and provides access (via  
19 a "capped tee" or equivalent point of access) to the City of  
20 Goodyear for its use.

21 d) the design, construction, operation, and main-  
22 tenance of well-head treatment units, if deemed appropriate by EPA  
23 pursuant to Subparagraph C.2, for Subunit B/C groundwater wells  
24 with contaminant concentrations above Clean-up Standards.

25 e) the design, construction, operation, and main-  
26 tenance of soil vapor extraction units equipped with emission  
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1 controls to remove VOCs from the vadose zone where VOC residues  
2 pose a threat to groundwater quality in Subunit A, as provided in  
3 Subparagraph C.6 and C.7.

4 f) institutional controls, if any, restricting the  
5 use of untreated groundwater exceeding Clean-up Standards.  
6 Institutional controls shall be in addition to and not in lieu of  
7 the Groundwater Remedy.

8 g) implementation of the recommendations of the  
9 contaminant transport well evaluation report as described in  
10 Subparagraph D.3 of this Section.

11 h) the continued operation and maintenance of the  
12 Operable Unit Remedy pursuant to Section VII.C.9 of this Consent  
13 Decree.

#### 14 2. Determination of Well-Head Treatment Requirements

15 Should the water quality in any of the twenty (20) existing  
16 production wells described in Subparagraph C.1.a. or Subunit B/C  
17 wells exceed Clean-up Standards of contaminants listed on Table  
18 2-5 of the 1989 ROD and such contamination is related to the Site,  
19 Defendants shall investigate to determine, upon EPA approval, if  
20 well-head treatment is required and implement well-head treatment  
21 where EPA determines it is necessary. Well-head treatment shall  
22 be in addition to and not in lieu of the Groundwater Remedy.

#### 23 3. Groundwater Extraction System/Zone of Capture

24 Upon implementation of the groundwater extraction system,  
25 Defendants shall determine the vertical and lateral boundaries of  
26 the "zone of capture" by groundwater monitoring. The zone of  
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capture will encompass the volume of Subunit B/C groundwater exceeding Clean-up Standards. Defendants shall achieve the zone of capture by the pumping of the twenty (20) existing production wells described in Subparagraph C.1.a., as deemed appropriate by EPA, and Defendants' pumping of the new extraction wells installed pursuant to Subparagraph C.1.a., the requirements of the 1989 ROD, and the results of the Field Investigations done pursuant to Subparagraph D of this Section. Defendants shall maintain the zone of capture by ensuring a hydraulic gradient from the edges of the volume of Subunit B/C groundwater exceeding Clean-up Standards to the extraction and any of the existing twenty (20) production wells described in Subparagraph C.1.a.

#### 4. Treatment Plant Discharges

a) Defendants shall treat all water from the groundwater extraction system so that the effluent water meets Clean-up Standards at the sampling points defined in Subparagraph C.1.b. During start-up activities, Defendants shall sample extracted water to and from the treatment plant on a schedule as provided for in the preliminary Operation and Maintenance Plan for the Groundwater Remedy in accordance with Subparagraph D of this Section.

b) During Routine Operations, the treatment plant discharge must meet Clean-up Standards at the sampling points defined in Subparagraph C.1.b. based on a sampling schedule to be contained in the final, EPA-approved Operation and Maintenance Plan for the Groundwater Remedy. Defendants shall develop an Operation and Maintenance Plan pursuant to Subparagraph D of this Section that

1 shall include compliance monitoring programs to demonstrate  
2 continued compliance with the requirements of this Section.  
3 Defendants shall orally report any CERCLA Section 103 reportable  
4 releases, any unscheduled treatment plant shut-downs exceeding  
5 forty-eight (48) hours, and any treatment plant noncompliance with  
6 Clean-up Standards to EPA and the State (and the City of Goodyear,  
7 if appropriate) within twenty-four (24) hours of discovery.  
8 Defendants shall follow oral notification with a written submission  
9 to EPA (and the City of Goodyear, if appropriate) within five (5)  
10 days of Defendants' oral notification to EPA of the event. This  
11 submission shall include a description of the event and its cause,  
12 and the length of the event, including the dates and times. If the  
13 event has not been corrected, a discussion of the anticipated time  
14 it is expected to continue, and the steps taken or planned to  
15 eliminate and prevent recurrence of this event shall also be  
16 included in this written submission. Complying with these  
17 reporting requirements shall not excuse any stipulated penalties  
18 resulting from the event.

19 5. Groundwater Remedy Operation and Maintenance Period

20 Defendants shall continue operation and maintenance of the  
21 Groundwater Remedy until water quality data from all monitoring  
22 wells listed in the final Operation and Maintenance Plan for the  
23 Groundwater Remedy comply with the Clean-up Standards for twelve  
24 (12) consecutive months and the requirements of Section XXXXI  
25 (Termination and Satisfaction) are met.  
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1 || 6. Soil Vapor Extraction Unit

2 Defendants shall construct and implement a Soil Vapor Ex-  
3 traction (SVE) Unit or Units with air emissions controls in the  
4 target zone as specified by Appendix B and the 1989 ROD.  
5 Defendants shall operate and maintain on-line (without any bypass)  
6 air emission controls at all times during operation of a SVE unit.  
7 Defendants shall implement SVE in sub-areas of the target zone of  
8 the Site, where application of the VLEACH model, or a similarly  
9 EPA-approved vadose zone model, indicates that remaining VOC  
0 residues in the soil will result in VOC concentrations in Subunit  
1 A groundwater that exceed Clean-up Standards. VOC residues in the  
2 soil shall be based on soil gas sampling results and any other data  
3 deemed appropriate by EPA. Defendants shall implement SVE in each  
4 sub-area according to the schedule set forth in Subparagraph D for  
5 the first sub-area.

6 7. SVE Operation and Maintenance Period

7 a. Defendants shall continue operation of the SVE unit(s) in  
8 any sub-area until the requirements of the SVE Operation Flow Chart  
9 (Appendix B) have been satisfied based on EPA approval.

b. Defendants shall continue operation of the SVE unit(s) in the final sub-area until the following events occur:

2 i) The requirements of the SVE Operation Flow Chart  
3 (Appendix B) have been satisfied based on EPA approval, and;

4           ii) The requirements of Section XXXXI (Termination and  
5 Satisfaction) of this Consent Decree are met for the SVE portion  
6 of the Work.

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1        2. Within thirty (30) days after the entry of this Decree,  
2 Defendants shall initiate preliminary SVE and Field Investigation  
3 conceptual design activities, and shall select Contractor(s) to  
4 carry out SVE and Field Investigation .

5        3. Within one hundred eighty (180) days after entry of this  
6 Consent Decree, Defendants shall submit to EPA a contaminant  
7 transport well evaluation report which shall determine if any of  
8 the transport wells cause significant contamination between Subunit  
9 A and Subunit B/C. This report shall include, but not be limited  
10 to, recommendations for well closures, abandonment procedures, and  
11 a schedule for the work recommended by this report.

12        4. EPA shall review and approve or disapprove the contaminant  
13 transport well evaluation report, in accordance with the require-  
14 ments of Section VIII (Reporting and Approvals/Disapprovals) of  
15 this Decree.

16        5. Within ninety (90) days after EPA's decision to approve  
17 the contaminant transport well evaluation report, Defendants shall  
18 commence and continue the approved remedial action in accordance  
19 with the approved schedule for this work.

20                    SVE Remedial Design/Remedial Action

21        6. Within sixty (60) days after entry of this Decree,  
22 Defendants shall submit a design memorandum regarding the SVE. The  
23 design memorandum shall present the basic methodology, design  
24 criteria and parameters, preliminary work schedule, scope of the  
25 SVE field investigation, and critical issues regarding  
26 implementation of the Work.



1        7. EPA shall review and approve or disapprove the design  
2 memorandum in accordance with the requirements of Section VIII  
3 (Reporting and Approvals/Disapprovals) of this Decree.

4        8. Within one hundred thirty five (135) days of EPA's  
5 decision to approve the SVE design memorandum of Work, Defendants  
6 shall submit a conceptual design for that work. For the SVE Work,  
7 conceptual design means about 90% of complete final design.

8 The conceptual design for the SVE units shall include, but not be  
9 limited to, the following:

10            a. Design analysis, including analysis necessary to satisfy  
11 Federal Aviation Administration (FAA), State, and local require-  
12 ments;

13            b. Locations and preliminary order of sub-areas where SVE  
14 units will be used;

15            c. Major and ancillary equipment list;

16            d. Copies of draft easements;

17            e. Draft Plans and Specifications;

18            f. Draft Emergency Contingency plan;

19            g. Construction schedule for first sub-area and preliminary  
20 construction schedule for subsequent sub-area(s) (phasing).

21            h. QA/QC Plan that meets the requirements of Section X  
22 (QA/QC) of this Decree;

23            i. Health and Safety Plan in accordance with Section IX  
24 (Worker Health and Safety Plan) of this Decree;

25            j. SVE system Operation and Maintenance plan including:  
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i. Recommended frequency and methodology of measuring pressure, flow rate, VOC concentrations, and other parameters necessary to monitor and operate the system's performance. These shall include separate schedules for start-up and routine operations.

ii. Proposed decision-making process and criteria for shutting down specific soil vapor extraction wells, based on the flowchart included in Appendix B.

iii. Recommended frequency for testing air emissions during start-up and routine operations.

iv. Recommended frequency for measurement of soil vapor during system rebound, and criteria for restarting soil vapor extraction in any particular area.

9. EPA shall review and approve or disapprove the conceptual design in accordance with the requirements of Section VIII (Reporting and Approvals/Disapprovals) of this Decree.

10. Within thirty (30) days after EPA approval of the conceptual design for the SVE unit(s), Defendants shall submit the final draft design and specifications for the SVE unit(s) for the first sub-area. Final draft SVE design and specifications shall consist of the finalized items included in the conceptual design (see Subparagraph D.8.a-j).

11. EPA shall review and approve or disapprove the final draft design in accordance with the requirements of Section VIII (Reporting and Approvals/Disapprovals) of this Decree.

1        12. Within sixty (60) days after EPA approval of the final  
2 design for the SVE system in a given sub-area, Defendants shall  
3 commence and continue construction of the facilities for the  
4 implementation of that system in accordance with the approved  
5 construction schedule.

6        13. Defendants shall commence SVE start-up activities for  
7 that system in a given sub-area within a period not to exceed one  
8 hundred eighty (180) days after commencement of construction  
9 activities for that sub-area.

10       14. Within sixty (60) days after start-up of a SVE unit for  
11 a given sub-area, Defendants may submit a revised SVE Operation and  
12 Maintenance Plan. If a revised O&M Plan is not submitted, SVE  
13 Routine Operations for a given sub-area shall commence sixty (60)  
14 days after start-up. Otherwise, SVE Routine Operations commence  
15 upon EPA approval of the revised, final O&M Plan.

16       15. Within thirty (30) days after the initial shutdown of the  
17 last SVE extraction well for a given sub-area as defined by  
18 Appendix B, Defendants shall submit SVE final draft design and  
19 specifications for the next sub-area to be remedied and continue  
20 such work for this new sub-area in accordance with Subparagraphs  
21 D.11-14 above.

22        Groundwater Remedy Remedial Design/Remedial Action

23       16. Within ninety (90) days after entry of this Decree,  
24 Defendants shall submit a Field Investigation Work Plan. The Field  
25 Investigation Work Plan shall include, but not be limited to, a  
26 description of the nature and purpose of the pre-remedial design  
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1 activities for the Groundwater Remedy to be conducted including:  
2 1) Method to determine depth of contaminants in Subunit B/C  
3 groundwater; 2) Placement and method for installation of new  
4 Subunit B/C monitoring wells; 3) Criteria for supplemental Subunit  
5 B/C monitoring wells and easements; 4) Method for determining  
6 design of extraction system; 5) Method for delineation of the  
7 Subunit B/C contaminant plume; 6) Proposed aquifer testing to  
8 determine Subunit B/C production capacity and optimum pumpage rates  
9 to meet the zone of capture requirements of this Decree; 7) Health  
10 and Safety Plan that meets the requirements of Section IX (Worker  
11 Health and Safety Plan) of this Decree; 8) QA/QC Plan which meets  
12 the requirements of Section X (QA/QC) of this Decree; and  
13 9) Schedule of field investigation activities and reports to be  
14 submitted to EPA.

15 17. EPA shall review and approve or disapprove the Field  
16 Investigation Work Plan in accordance with the requirements of  
17 Section VIII (Reporting and Approvals/Disapprovals) of this Decree.

18 18. Within one hundred eighty (180) days after EPA approval  
19 of the Field Investigation Work Plan, Defendants shall submit the  
20 conceptual (30%) design for the Groundwater Remedy. The Groundwater  
21 Remedy conceptual design shall include, but not be limited to, the  
22 following:

23 a. Technical Memorandum documenting the groundwater field  
24 investigations and the feasibility of maintaining hydraulic zone  
25 of capture with the new extraction and existing twenty (20)  
26 production wells described in Subparagraph C.1.a.;

b. Design analysis, including analysis necessary to satisfy State, FAA, and local requirements;

c. Location of extraction/reinjection wells or recharge system, the treatment plant, and the end-use conveyance system;

d. Major equipment list:

e. Approximate pumping rates for all extraction wells:

f. Site plan (piping/layout);

g. Copies of surveys showing the location of proposed easements;

#### h. Piping and flow diagrams for treatment plant;

i. List of ancillary equipment (substations, etc.);

j. Emergency contingency plan;

k. End-use contingency plan;

1. Agreements for acceptance of treated water for end-use purposes, if applicable;

m. Proposed institutional controls.

19. EPA shall review and approve or disapprove the conceptual design in accordance with the requirements of Section VIII (Reporting and Approvals/Disapprovals) of this Decree.

20. Within ninety (90) days after EPA approval of the conceptual design for the Groundwater Remedy, Defendants shall submit final draft design and specifications for the Groundwater Remedy. The final draft design and specifications for the Subunit B/C Groundwater Remedy shall include, but not be limited to:

a. Design analysis;



1           iii. Recommended frequency for water quality testing  
2 during potential rebound period, and criteria for restarting an  
3 extraction well in any particular area.

4           iv. Recommended process for electronic transfer of  
5 groundwater monitoring data to the State and EPA. Data format  
6 required by the State and by EPA shall be the same.

7           23. EPA shall review and approve or disapprove the preliminary  
8 Operation and Maintenance manual in accordance with the require-  
9 ments of Section VIII (Reporting and Approvals/Disapprovals) of  
10 this Decree.

11           24. Within ninety (90) days after EPA approval of the final  
12 design for the Groundwater Remedy, Defendants shall commence and  
13 continue construction of the facilities for the implementation of  
14 that remedy in accordance with the approved construction schedule.

15           25. Within a period of time not to exceed two hundred seventy  
16 (270) days after the start of construction of the Groundwater  
17 Remedy, Defendants shall commence start-up for that remedy.

18           26. Within sixty (60) days of start-up of the Groundwater  
19 Remedy, Defendants shall submit a final draft Operation and  
20 Maintenance Plan.

21           27. EPA shall review and approve or disapprove the final  
22 Operation and Maintenance Plan in accordance with the requirements  
23 of Section VIII (Reporting and Approvals/Disapprovals) of this  
24 Decree.

25           28. EPA shall permit a reasonable time for completion of  
26 start-up testing of all facility components necessary for Routine  
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1 Operation of the Groundwater Remedy. Upon one hundred eighty  
2 (180) days after Groundwater Remedy start-up and EPA's approval of  
3 the final Operation and Maintenance Plan, Defendants shall begin  
4 and thereafter maintain Routine Operation activities in accordance  
5 with the final, EPA approved O&M Plan.

6 29. At any time during Routine Operation of the Groundwater  
7 Remedy, Defendants may combine the final Operation and Maintenance  
8 Plan for the Operable Unit Remedy and the final Operation and  
9 Maintenance Plan for the Groundwater Remedy into one unified  
10 Operation and Maintenance Plan. The unified Operation and  
11 Maintenance Plan shall be subject to approval by EPA.

12 30. EPA shall review and approve or disapprove the unified  
13 Operation and Maintenance Plan in accordance with the requirements  
14 of Section VIII (Reporting and Approvals/Disapprovals) of this  
15 Decree. Until Defendants receive EPA approval of the unified  
16 Operation and Maintenance Plan, Defendants shall continue to  
17 implement the individual Operation and Maintenance Plans for the  
18 Operable Unit Remedy and for the Groundwater Remedy.

19 31. Upon EPA approval of the unified Operation and  
20 Maintenance Plan, Defendants shall thereafter maintain Routine  
21 Operation of both the Operable Unit Remedy and the Groundwater  
22 Remedy in accordance with the unified Operation and Maintenance  
23 Plan.



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3 VIII. REPORTING AND APPROVALS/DISAPPROVALS

4 A. Progress Reports

5 1. Defendants shall provide written progress reports to  
6 EPA and the State on a monthly basis prior to start-up, and on a  
7 bi-monthly basis until commencement of Routine Operations, and on  
8 a quarterly basis after commencement of Routine Operations. These  
9 progress reports shall include a description of: (a) all actions  
10 taken to comply with this Consent Decree, including a general  
11 description of the Work activities commenced or completed during  
12 the reporting period; (b) the results of all sampling, testing, and  
13 other data generated by Defendants during the previous reporting  
14 period; (c) all activities projected to be commenced or completed  
15 during the next reporting period; and (d) any problems that have  
16 been encountered or are anticipated by Defendants in commencing or  
17 completing the Work activities and a description of efforts made  
18 to mitigate any problems or potential delays. These progress  
19 reports shall be submitted to EPA by the tenth (10th) of each month  
20 for work done the preceding month, bi-month, or quarter, as the  
21 case may be, and planned for the current month, bi-month, or  
22 quarter, as the case may be, beginning with the third (3rd) month  
23 after entry of this Consent Decree. In addition, the United States  
24 or the State may request periodic briefings by Defendants to  
25 discuss the progress of the Work.

1           B. Reports, Plans, and Other Items

2           1. Any reports, plans, specifications (including discharge  
3 or emission limits), schedules, appendices, and attachments  
4 required or established by this Consent Decree are, upon approval  
5 by EPA, incorporated into this Consent Decree.

6           2. If EPA disapproves any plans or reports (other than  
7 progress reports), or other items required to be submitted to EPA  
8 for approval pursuant to this Consent Decree, Defendants shall  
9 correct any deficiencies and resubmit the plan, report, or item for  
10 EPA approval. Such plan, report, or item shall be postmarked  
11 within fifteen (15) working days from Defendants' receipt of EPA  
12 disapproval.

13           3. Any disapprovals by EPA shall be in writing and shall  
14 include an explanation by EPA of why the plan, report, or item is  
15 being disapproved.

16           4. In attempting to correct any deficiency as required by  
17 Subparagraph B.2., Defendants shall address each of EPA's comments  
18 and resubmit to EPA the previously disapproved plan, report, or  
19 item with the required changes within the fifteen (15) day deadline  
20 established by that Subparagraph, except that the period for  
21 Defendants' response may be extended by EPA, at its discretion.

22           5. If EPA determines that any plan, report, or item is  
23 substantively deficient after resubmission, then Defendants shall  
24 be deemed to be in violation of this Consent Decree and subject to  
25 stipulated penalties as governed by Section XXVI (Stipulated  
26 Penalties) of this Consent Decree. In the event that the  
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1 deficiency in the plan, report or other item is corrected by one  
2 subsequent resubmission permitted under this Subparagraph B(2)-(4),  
3 then Defendants shall not be deemed to be in violation of this  
4 Consent Decree.

5 IX. WORKER HEALTH AND SAFETY PLAN

6 The Worker Health and Safety Plan that Defendants are required  
7 to submit pursuant to Section VII (Work to be Performed) of this  
8 Consent Decree shall satisfy the requirements of the Occupational  
9 Safety and Health Guidance for Hazardous Waste Site Activities  
10 [October 1985 (DHH 5 NIOSH) Publication No. 85-115] and EPA's  
11 Standard Operating Safety Guides (EPA, OERR November 1984) and  
12 amendments thereto.

13 X. QUALITY ASSURANCE/QUALITY CONTROL

14 A. Defendants shall submit to EPA for approval, at the same  
15 time as it submits the final draft design documents in accordance  
16 with Section VII.D., a Quality Assurance/Quality Control ("QA/QC")  
17 Plan for Work activities. The QA/QC Plan for the Work shall,  
18 where applicable, be prepared in accordance with current EPA  
19 guidance, Interim Guidelines and Specifications for Preparing  
20 Quality Assurance Project Plans, QAMS-005/80, Data Quality  
21 Objective Guidance (EPA/540/G87/003 and 004), and amendments to  
22 such guidelines. Additionally, the QA/QC Plan for the Work shall  
23 include elements necessary for the implementation of trial test(s)  
24 of the Groundwater Remedy and SVE Unit(s) used as part of the Work.  
25 The QA/QC Plan for the Work shall include a description of the  
26 mechanism that shall be used to verify that both the Groundwater  
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1 Remedy and SVE Unit(s) processes are operating within acceptable  
2 limits. Upon approval and notice by EPA to Defendants, Defendants  
3 shall implement the QA/QC Plan for the Work.

4 B. Defendants shall utilize QA/QC procedures in accordance  
5 with the QA/QC plans submitted pursuant to this Consent Decree, and  
6 shall utilize standard EPA chain of custody procedures, as  
7 documented in National Enforcement Investigations Center Policies  
8 and Procedures Manual, as revised in May 1986, and amendments  
9 thereto, and the National Enforcement Investigations Center Manual  
10 for the Evidence Audit, published in September 1981 and amendments  
11 thereto, for all sample collection and analysis activities. In  
12 order to provide quality assurance and maintain quality control  
13 regarding all samples collected pursuant to this Consent Decree,  
14 Defendants shall:

15 1. Ensure that all contracts with laboratories utilized by  
16 Defendants for analysis of samples taken pursuant to this Consent  
17 Decree provide for access of EPA personnel and EPA authorized  
18 representatives to assure the accuracy of laboratory results  
19 related to the Work,

20 2. Ensure that laboratories utilized by Defendants for  
21 analysis of samples taken pursuant to this Consent Decree perform  
22 all analyses according to EPA methods or methods deemed in advance  
23 satisfactory by EPA. Accepted EPA methods are documented in the  
24 "Contract Lab Program Statement of Work for Inorganic Analysis"  
25 dated July 1988, and the "Contract Lab Program Statement of Work  
26 for Organic Analysis" dated February 1988.

1        3. Ensure that all laboratories utilized by Defendants for  
2 analysis of samples taken pursuant to this Consent Decree  
3 participate in an EPA or EPA equivalent QA/QC program. As part of  
4 the QA/QC program and upon request by EPA, such laboratories shall,  
5 at Defendants' expense, perform analyses of samples provided by EPA  
6 to demonstrate the quality of each laboratory's data. EPA may  
7 provide to each laboratory a maximum of four (4) samples per year  
8 per analytical combination (e.g., four (4) aqueous samples for  
9 analysis by gas chromatography/mass spectrometry, four  
10 soil/sediment samples for analysis by gas chromatography/mass  
11 spectrometry).

12                    XI. PERIODIC REVIEW TO ASSURE PROTECTION  
13                    OF HUMAN HEALTH AND THE ENVIRONMENT

14        A. To the extent required by Section 121(c) of CERCLA, 42  
15 U.S.C. Section 9621(c), and any applicable regulations, EPA will  
16 review the Work at the Site at least every five (5) years after  
17 the entry of this Consent Decree to assure that human health and  
18 the environment are being protected.

19        B. If upon such review, EPA determines that further response  
20 action in accordance with Sections 104 or 106 of CERCLA is  
21 appropriate at the Site, then EPA may take or require that  
22 Defendants take such action. Defendants and the public shall be  
23 provided with an opportunity to comment on any additional  
24 activities proposed by EPA as a result of the periodic review  
25 pursuant to this Section to the extent required under Section 104  
26 or 106 of CERCLA, as appropriate.

XII. ADDITIONAL WORK

A. In the event that EPA or Defendants determine that additional response activities are necessary to implement the Work described in this Consent Decree, notification of such additional work will be provided to the Project Coordinator for the other party.

B. Any additional work determined to be necessary by Defendants is subject to approval by EPA.

C. Any additional work determined to be necessary by Defendants and approved by EPA, or determined by EPA to be necessary to carry out the SVE or Groundwater Remedy described in the 1989 ROD or to meet the requirements of Section VII (Work to be Performed) of this Consent Decree, shall be completed by Defendants in accordance with the standards, specifications, and schedules approved by EPA.

D. Unless otherwise stated by EPA, within thirty (30) days of receipt of notice by EPA that additional work is necessary pursuant to this Section, Defendants shall submit a work plan to EPA. The work plan shall conform to the requirements in Section VII (Work to be Performed) of this Decree.

E. If EPA disapproves the plan pursuant to the provisions of Section VII (Work to be Performed), Defendants, consistent with Section VII (Work to be Performed) and Section VIII (Reporting and Approvals/Disapprovals) of this Decree, shall submit a modified plan.

1 F. Defendants shall promptly implement the plan as approved  
2 or modified by EPA.

3 XIII. PROJECT COORDINATORS

4 A. Within thirty (30) days after entry of this Consent  
5 Decree, EPA, the State and Defendants shall notify each other in  
6 writing of the name, address, and telephone number of their  
7 respective designated Project Coordinators, and any successors, to  
8 monitor the progress of the Work and to coordinate communication  
9 between the parties. Only one Project Coordinator shall be  
10 designated to represent Defendants. The EPA Project Coordinator  
11 shall have the authority vested in the Remedial Project Manager and  
12 the On-Scene Coordinator by 40 C.F.R. Section 300, et seq., 50 Fed.  
13 Reg. 47912 (Nov. 20, 1985), including such authority as may be  
14 added by amendments to 40 C.F.R. Section 300, as well as the  
15 authority to ensure that the Work is performed in accordance with  
16 all applicable statutes, regulations, and this Consent Decree.  
17 The EPA Project Coordinator shall also have the authority to  
18 require a cessation of the performance of the Work or any other  
19 activity at the Site that, in the opinion of the EPA Project  
20 Coordinator, may present or contribute to an endangerment to public  
21 health, welfare, or the environment or cause or threaten to cause  
22 the release of hazardous substances from the Site. In the event  
23 the EPA Project Coordinator suspends the Work or any other activity  
24 at the Site, the parties may extend the compliance schedule of this  
25 Consent Decree as appropriate for the minimum period of time  
26 necessary to perform the Work, but in no event for a period longer

1 than the time of the suspension of Work or other activities.  
2 Should Defendants desire to extend the compliance schedule pursuant  
3 to this Section, Defendants shall propose and EPA shall determine  
4 the length of any extension. If the EPA Project Coordinator  
5 suspends the Work or any other activity for any of the reasons set  
6 forth in this Subparagraph A and those reasons are due to acts or  
7 omissions of Defendants or their contractor(s) not required by this  
8 Consent Decree, then any extension of the compliance schedule shall  
9 be at EPA's discretion. The Project Coordinators do not have the  
10 authority to modify in any way the terms of this Consent Decree.  
11 The absence of the EPA Project Coordinator from the Site shall not  
12 be cause for stoppage of the Work. EPA, the State, and Defendants  
13 may change their respective Project Coordinators by notifying the  
14 other parties in writing at least seven (7) days prior to the  
15 change.

16 B. Defendants' Project Coordinator may assign other  
17 representatives, including other contractors, to serve as a Site  
18 representative for oversight of performance of daily operations  
19 during remedial activities.

20 C. The EPA and the State Project Coordinators may assign  
21 other representatives, including other EPA or State employees or  
22 contractors, to serve as a Site representative for oversight of  
23 performance of daily operations during remedial activities. Prior  
24 to invoking formal dispute resolution procedures, any unresolved  
25 technical disputes arising between the EPA or the State Site  
26 representative and Defendants or their contractors shall be  
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1 referred to the EPA Project Coordinator.

2 XIV. ACCESS

3 A. Defendants shall provide the United States, the State, and  
4 their authorized representatives, including contractors, access at  
5 all reasonable times to the Site and any contiguous property owned  
6 by or to the extent access to the property is controlled by or  
7 available to Defendants. EPA shall endeavor to provide reasonable  
8 notice prior to requesting access to the property. The United  
9 States, the State, and their authorized representatives shall  
10 comply with all applicable provisions of the Worker Health and  
11 Safety Plan submitted as part of the work plans required by this  
12 Consent Decree and approved by EPA, and shall comply with all  
13 applicable provisions of federal law and security requirements.

14 B. Within sixty (60) days after the entry of this Consent  
15 Decree, any Defendant who owns any interest in the Site, shall (1)  
16 ensure that a copy of this Consent Decree is provided to any  
17 subsequent purchaser of the property prior to sale and, (2) record  
18 notation on each deed, title, or other instrument of conveyance for  
19 the Site or portions thereof stating that the property is subject  
20 to this Consent Decree.

21 C. The obligations under this Section of the Decree of each  
22 Defendant who owns any interest in the Site, shall run with the  
23 land and shall be binding upon any and all such Defendant(s) and  
24 any and all persons who subsequently acquire any such interest or  
25 portion thereof (hereinafter "successors-in-title"). Within ten  
26 (10) days after entry of this Consent Decree, each Defendant who  
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1 owns any interest in the Site shall record at the Registry of  
2 Deeds, or other office where land ownership and transfer records  
3 are maintained for the property, a notice of obligation to provide  
4 access and related covenants. Each subsequent deed to any such  
5 property included in the Site shall reference the recorded location  
6 of such notice and covenant applicable to the property.

7 D. Any Defendant that owns an interest in the Site and any  
8 successor-in-title shall, prior to the conveyance of any such  
9 interest, give written notice of this Consent Decree to the grantee  
10 and written notice to EPA and the State of the proposed conveyance,  
11 the name and address of the grantee, and the date on which notice  
12 of the Consent Decree was given to the grantee. In the event of  
13 any such conveyance, Defendants' obligations under this Consent  
14 Decree shall continue to be met by all Defendants and, subject to  
15 approval by the United States, by the grantee.

16 E. To the extent that access to or easements over property  
17 on the Site not owned or controlled by Defendants or access or  
18 easements over property other than the Site is required for the  
19 proper and complete performance of this Consent Decree, Defendants  
20 shall use their due diligence to obtain access agreements from the  
21 present owners or those persons who own or have control over such  
22 property in a timely manner for Field Investigation activities and  
23 within sixty (60) days after approval of 30% Conceptual Design for  
24 all other activities. Access agreements shall provide reasonable  
25 access to Defendants, the United States, the State, and their  
26 authorized representatives. In the event that access agreements  
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1 are not obtained within the time period described above, Defendants  
2 shall notify EPA within five (5) days thereafter regarding both  
3 the lack of, and efforts to obtain, such agreements. If EPA  
4 determines it is necessary, EPA may exercise its access authorities  
5 under Section 104 of CERCLA, 42 U.S.C. Section 9604, in order to  
6 obtain access for the performance of the Work required by this  
7 Consent Decree. Defendants may assert that the Force Majeure  
8 provisions of Section XXVIII (Force Majeure) govern any delays  
9 caused by difficulties in obtaining necessary access to or  
10 easements over property but must prove that the requirements of  
11 Section XXVIII (Force Majeure) are met before any such delays are  
12 recognized as a Force Majeure event under this Consent Decree. In  
13 the event EPA determines that it is appropriate to exercise its  
14 access authorities under Section 104(e) of CERCLA in order to  
15 obtain access for the performance of this Consent Decree,  
16 Defendants shall reimburse EPA in accordance with the procedures  
17 set forth in Section XXI (Reimbursement of Future Response and  
18 Oversight Costs) of this Consent Decree, for all costs incurred in  
19 the exercise of such powers, unless Defendants demonstrate that  
20 such costs are inconsistent with the NCP.

21 F. Access shall be for purposes of conducting any activity  
22 authorized by this Consent Decree, including, but not limited to:

23 1. Monitoring the Work or any other activities taking  
24 place;

25 2. Verifying any data or information submitted to EPA;  
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1        3. Conducting investigations relating to contamination at or  
2 near the Site;

3        4. Obtaining samples at or near the Site; and

4        5. Inspecting and copying records, operating logs, contracts,  
5 or other documents maintained or generated by Defendants or their  
6 representatives to assess Defendants' compliance with this Consent  
7 Decree.

8        G. Notwithstanding any provision of this Consent Decree, the  
9 United States retains all of its access authorities and rights  
10 under CERCLA, RCRA, and any other applicable statutes, regulations,  
11 or permits. Notwithstanding any provisions of this Consent Decree,  
12 the State retains all of its access authorities and rights under  
13 RCRA, under Title 49 and Title 45 of the Arizona Revised Statutes,  
14 and under any other applicable statutes, regulations, or permits.

15        H. Defendants shall prohibit the installation or use of wells  
16 on the Site for purposes of providing potable water for human  
17 consumption, unless treated to achieve drinking water standards.  
18 In the event any Defendant transfers ownership of all or portions  
19 of the Site, such Defendant shall ensure that the subsequent  
20 purchaser agree to prohibit the use of groundwater drawn from wells  
21 located at the Site for human consumption, except as provided  
22 above.

#### 23                    XV. ASSURANCE OF ABILITY TO COMPLETE WORK

24        A. Defendants shall demonstrate their ability to complete  
25 the Work and to pay all claims that arise from the performance of  
26 the Work by obtaining, and presenting to EPA for approval within  
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1 sixty (60) days after the entry of this Consent Decree, one of the  
2 following items: 1) a performance bond; 2) one or more letters of  
3 credit equaling the total estimated cost of the Work; or 3) a  
4 guarantee by a third party. If Defendants seek to demonstrate the  
5 ability to complete the Work through a guarantee by a third party,  
6 Defendants must provide financial information regarding the  
7 guarantor's net worth, cash flow, total liabilities, and current  
8 rating for the third party's most recent bond issuance sufficient  
9 to demonstrate to EPA's satisfaction that the guarantor has the  
10 financial ability to finance completion of the Work.

11 B. In lieu of any of the three (3) items listed above,  
12 Defendants may present to EPA, within twenty (20) days after the  
13 entry of this Decree, financial information sufficient to satisfy  
14 EPA that Defendants have sufficient assets to make it unnecessary  
15 to require additional assurances. If Defendants rely on financial  
16 information for financial assurance, Defendants shall submit such  
17 financial information on a bi-annual basis prior to commencement  
18 of Routine Operations, and on an annual basis after commencement  
19 of Routine Operations. Defendants may submit such financial  
20 information in the form of quarterly or annual reports to  
21 shareholders, as the case may be, if such reports contain the  
22 information required by this Section. If EPA determines  
23 Defendants' financial assurances to be inadequate, EPA shall notify  
24 Defendants in writing of the basis of its determination. EPA may  
25 consider the policies of the financial assurance requirements of  
26 RCRA in determining the adequacy of Defendants' financial  
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1 assurances. Defendants shall obtain one of the three financial  
2 instruments listed above pending resolution of any dispute under  
3 Section XXVII (Dispute Resolution) of this Consent Decree.  
4 Defendants' inability to demonstrate financial ability to complete  
5 the Work shall not excuse performance of any activities required  
6 under this Consent Decree.

7 C. Defendants shall maintain a segregated account dedicated  
8 to funding Defendants' obligations pursuant to this Consent Decree  
9 (the "Site Account").

10 XVI. SUBMISSION OF DOCUMENTS, SAMPLING, AND ANALYSIS

11 A. Defendants shall obtain a quality assurance report on a  
12 quarterly basis from laboratories being used by Defendants in  
13 performing work at the Site. Defendants shall forward each report  
14 to EPA and the State on January 30th, April 30th, July 30th, and  
15 October 30th of each year. This report shall contain information  
16 that demonstrates that Defendants are complying with Section X  
17 (QA/QC) of this Consent Decree and the QA/QC Plans submitted  
18 pursuant to this Consent Decree.

19 B. Any analytical or design data generated or obtained by  
20 Defendants that are related to the Work shall be provided to EPA  
21 and the State within seven (7) days of any request by EPA for such  
22 data.

23 C. Employees of EPA and the State and their authorized  
24 representatives shall have the right, upon request, to take splits  
25 of any samples obtained by Defendants or anyone acting on  
26 Defendants' behalf in the implementation of the Work. Defendants  
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1 shall also have the right upon request to obtain splits of samples  
2 taken independently by EPA, the State, and their authorized  
3 representatives.

4 D. During design and construction, Defendants shall notify  
5 EPA seven (7) working days prior to any sampling conducted by  
6 Defendants or anyone acting on their behalf. EPA shall notify  
7 Defendants within thirty (30) working days of notification of  
8 sampling to request to take possession of all or a portion of such  
9 sample.

10 E. Defendants need not provide EPA with 7-day notice of  
11 scheduled sampling relating to start-up and the Routine Operations  
12 of the treatment system. Prior to commencement of the Routine  
13 Operations of the treatment system, however, Defendants shall  
14 provide EPA with a schedule for all routine sampling relating to  
15 the operation of the treatment system. Defendants shall notify EPA  
16 seven (7) working days in advance of any changes in the routine  
17 sampling schedule. Defendants shall make good faith efforts to, but  
18 need not provide EPA with advance notice of changes in the routine  
19 treatment system sampling as a result of unexpected conditions.  
20 Defendants shall orally notify EPA within forty-eight (48) hours  
21 of such occurrence and shall provide EPA with the results of  
22 analysis of such sampling when the results become available.

23 F. At the request of EPA, Defendants shall allow split or  
24 duplicate samples to be taken by EPA, the State, or their  
25 authorized representatives, of any samples collected by Defendants  
26 with regard to the Site or pursuant to the implementation of this  
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1 Consent Decree. Defendants shall notify EPA not less than seven  
2 (7) working days in advance of any sample collection activity. In  
3 addition, EPA shall have the right to take any additional samples  
4 that EPA deems necessary.

5 G. All data, factual information, and documents submitted  
6 by Defendants to EPA and the State pursuant to this Consent Decree  
7 shall be subject to public inspection unless Defendants assert a  
8 confidential business information or trade secret claim as  
9 described in this Subparagraph G. Defendants shall not assert a  
10 claim of confidentiality regarding any hydrogeologic or geologic  
11 data, groundwater monitoring data, data relating to disposal  
12 activities, or any other data, information, or documents that are  
13 not entitled to protection under Section 104(e)(7)(F) of CERCLA,  
14 42 U.S.C. Section 9604(e)(7)(F) and 40 C.F.R. Part 2. Defendants  
15 may assert a claim of business confidentiality as to all or part  
16 of any process, method, technique, or any description thereof  
17 provided by Defendants in connection with this Consent Decree that  
18 Defendants claim constitute proprietary or trade secret information  
19 developed by Defendants or developed by their contractor or  
20 contractor's subcontractors, in accordance with 40 C.F.R. Section  
21 2.203. In addition, Defendants may assert business confidentiality  
22 claims covering part or all of the information provided in  
23 connection with this Consent Decree only as provided for by Section  
24 104(e)(7) of CERCLA, 42 U.S.C. Section 9604(e)(7), and pursuant to  
25 40 C.F.R. Section 2.203(b) or applicable State law. Any such claim  
26 shall be subject to EPA's confidentiality determination procedures  
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1 and, if determined by EPA to be confidential, afforded the  
2 protection by EPA provided in 40 C.F.R., Part 2, Subpart B and, if  
3 determined to be entitled to confidential treatment under State law  
4 by the State, afforded protection by the State under State law.

5 H. The provisions of this Section shall not constitute a  
6 waiver of any applicable claims of attorney work product or any  
7 other privilege under law. If Defendants assert any such  
8 privilege, Defendants shall, upon request, provide EPA with an  
9 identification of the title and subject matter of each document for  
10 which a privilege is asserted, and an explanation as to why the  
11 privilege is applicable to the document or portions thereof.

12 **XVII. RETENTION OF RECORDS**

13 A. Defendants shall preserve and retain all records and  
14 documents now in its possession or control or in the possession or  
15 control of its divisions, employees, or contractors that relate in  
16 any manner to the Site, regardless of any document retention policy  
17 to the contrary, for no less than six (6) years after the  
18 termination of this Consent Decree.

19 B. Until termination of this Consent Decree, Defendants shall  
20 preserve, and shall instruct the contractor, the contractors  
21 subcontractors, and anyone else acting on Defendants' behalf at the  
22 Site to preserve (in the form of originals or exact copies, or in  
23 the alternative, microfiche of all originals) all records,  
24 documents and information of whatever kind, nature, or description  
25 relating to the performance of the Work at the Site. After this  
26 six (6) year period, Defendants shall notify EPA and the State no  
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1 later than thirty (30) days prior to the destruction of such  
2 documents. Upon request by EPA or the State, Defendants shall make  
3 available to EPA or the State originals or copies of such records  
4 prior to their destruction.

5 XVIII. CLAIMS AGAINST THE FUND

6 Nothing in this Consent Decree shall be deemed to constitute  
7 a preauthorization of a CERCLA claim within the meaning of Sections  
8 111 or 112 of CERCLA, 42 U.S.C. Sections 9611 or 9612, or 40 C.F.R.  
9 Section 300.25(d). In consideration of the entry of this Consent  
10 Decree, Defendants agree not to make any claims pursuant to Section  
11 111, Section 112, or Section 106(b)(2) of CERCLA, 42 U.S.C.  
12 Sections 9611, 9612, 9606(b)(2), or any other provision of law  
13 directly or indirectly against the Hazardous Substance Superfund,  
14 or make other claims against EPA for those costs expended in  
15 connection with this Consent Decree.

16 XIX. RESPONSE AUTHORITY

17 A. Nothing in this Consent Decree shall be deemed to limit  
18 the response authority of EPA under Section 104 of CERCLA, 42  
19 U.S.C. Section 9604, or under Section 106 of CERCLA, 42 U.S.C.  
20 Section 9606, or under any other Federal response authority.

21 B. Nothing in this Consent Decree shall be deemed to limit  
22 the response or removal authority of the Arizona Department of  
23 Environmental Quality or any other agency of the State of Arizona  
24 or governmental unit as authorized by existing law.

1                                   XX. CERTIFICATION OF COMPLETION

2           A.     Within ninety (90) days after Defendants conclude that  
3 the Work required by this Consent Decree has been fully performed,  
4 Defendants shall so notify EPA, the State, and the Department of  
5 Justice, and shall schedule and conduct a pre-certification  
6 inspection to be attended by Defendants and EPA. Such inspection  
7 shall be followed by a written report submitted by Defendants  
8 within thirty (30) days of the inspection and shall include a  
9 certification by a professional engineer and Defendants' Project  
10 Coordinator that the Work has been completed in full satisfaction  
11 of the requirements of this Consent Decree. If, after completion  
12 of the pre-certification inspection and receipt and review of the  
13 written report, EPA, after reasonable opportunity to review and  
14 comment by the State, determines that the Work or any portion  
15 thereof has not been completed in accordance with this Consent  
16 Decree, EPA will notify Defendants in writing of the activities  
17 that must be undertaken to complete the Work and shall set forth  
18 in the notice a schedule for performance of such activities.  
19 Defendants shall perform all activities described in the notice in  
20 accordance with the specifications and schedules established  
21 therein.

22           B.     If EPA concludes, following the initial or any subsequent  
23 notification of completion by Defendants, that the Work has been  
24 fully performed in accordance with this Consent Decree, EPA will  
25 so certify in writing to Defendants. This certification shall  
26 constitute the certification of completion of the Work for purposes  
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1 of terminating this Consent Decree pursuant to Section XXXXI  
2 (Termination and Satisfaction), and providing Defendants with the  
3 protection provided in Section XXXIII (Covenant Not To Sue).

4 XXI. REIMBURSEMENT OF U.S. FUTURE RESPONSE AND OVERSIGHT COSTS

5 A. Defendants shall reimburse the Hazardous Substance  
6 Superfund for all response costs relating to the cleanup of  
7 contaminants identified in Table 2-5 of the ROD at the Site  
8 incurred by EPA after January 31, 1990. These costs include but  
9 are not limited to costs incurred by EPA to oversee and review the  
10 Work of Defendants, and any costs incurred under or in connection  
11 with this Consent Decree. Defendants reserve their right to  
12 demonstrate that such costs are inconsistent with the NCP. EPA's  
13 costs shall be documented by EPA's Agency Financial Management  
14 System Summary data ("SPUR reports") and EPA's Cost Documentation  
15 Management System report ("CDMS report"). No more than annually,  
16 the United States shall submit to Defendants, documentation of  
17 response and oversight costs incurred by the United States in the  
18 time period since the last demand for payment. EPA's SPUR reports,  
19 CDMS reports, and the Department of Justice's Case Cost Summary  
20 shall serve as the documentation for payment demands. EPA will  
21 also provide a summary of its indirect cost calculations.  
22 Defendants shall, within sixty (60) days of receipt of each demand  
23 for payment, remit a check for the amount of those costs made  
24 payable to the Hazardous Substances Superfund. Interest shall not  
25 accrue within such sixty (60) day time period if Defendants pay  
26 the full amount of each demand for payment.

1 B. The checks should reference the Phoenix-Goodyear Airport  
2 Superfund Site, Site number 619, and be addressed to:

3 U.S. Environmental Protection Agency

4 Region 9

5 Superfund Accounting

6 P.O. Box 360863M

7 Pittsburgh, PA 15251

8 Attn: Collection Officer for Superfund

9 A copy of the transmittal letter and a copy of the check shall be  
10 sent simultaneously to the EPA Project Coordinator.

11 C. No payment by Defendants in accordance with this Section  
12 is a penalty, fine, or monetary sanction of any kind.

13 XXII. REIMBURSEMENT OF U.S. PAST RESPONSE COSTS

14 Defendants shall pay \$1,500,000 to EPA for response costs  
15 incurred by the United States relating to the Site prior to January  
16 31, 1990. Defendants shall, within sixty (60) days of entry of  
17 this Consent Decree, remit a check for the full amount owed to the  
18 United States in the manner described above in Section XXI  
19 (Reimbursement of U.S. Future Response and Oversight Costs) of this  
20 Decree. Defendants also shall have the right to pay three (3) one-  
21 third (1/3) payments of the total amount no later than sixty (60),  
22 four hundred twenty-five (425), and seven hundred ninety (790)  
23 days, respectively, after entry of this Consent Decree. Each of  
24 these three (3) payments shall include interest on all outstanding  
25 amounts accruing sixty (60) days after entry of this Consent Decree  
26 in an amount equivalent to the amount that would be prescribed for  
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1 | prejudgment interest on the same principal amount by Section 107(a)  
2 | of CERCLA, 42 U.S.C. Section 9607(a).

3 | B. No payment by Defendants in accordance with this Section  
4 | is a penalty, fine, or monetary sanction of any kind.

5 | XXIII. REIMBURSEMENT OF STATE PAST RESPONSE, FUTURE RESPONSE,  
6 | AND OVERSIGHT COSTS

7 | A. Defendants shall pay \$75,333 to the State Water Quality  
8 | Assurance Revolving Fund for response costs incurred by the State  
9 | relating to the Site prior to January 31, 1990. Defendants shall,  
10 | within sixty (60) days of entry of this Consent Decree, remit a  
11 | check for the full amount owed to the State by mailing said check  
12 | to the Arizona Department of Environmental Quality, 2005 N. Central  
13 | Avenue, Phoenix, AZ 85004. Defendants shall also have the right  
14 | to pay three (3) one-third (1/3) payments of the total amount no  
15 | later than sixty (60), ninety (90), and one hundred twenty (120)  
16 | days, respectively, after entry of this Consent Decree. Each of  
17 | these three (3) payments shall include interest and all outstanding  
18 | amounts accruing sixty (60) days after entry of this Consent Decree  
19 | in an amount equivalent to the amount that would be prescribed for  
20 | prejudgment interest on the same principal amount by Section 107(a)  
21 | of CERCLA, 42 U.S.C. § 9607(a). No payment by Defendants in  
22 | accordance with this Section is a penalty, fine, or monetary  
23 | sanction of any kind.

24 | B. Defendants shall reimburse the Arizona Water Quality  
25 | Assurance Revolving Fund for all response costs relating to the  
26 | clean-up of contaminants identified in Table 2-5 of the 1989 ROD  
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1 at the Site incurred by the State after January 31, 1990. These  
2 costs include but are not limited to costs incurred by the State  
3 to oversee and review the Work of Defendants, and any costs  
4 incurred under or in connection with this Consent Decree.  
5 Defendants reserve the right to demonstrate that such costs are  
6 inconsistent with the NCP. No more than quarterly, the State shall  
7 submit to Defendants, documentation of response and oversight costs  
8 incurred by the State in the time period since the last demand for  
9 payment. The State will also provide a summary of its indirect  
10 cost calculations. Defendants shall, within sixty (60) days of  
11 receipt of each demand for payment, remit a check for the amount  
12 of those costs made payable to the Arizona Water Quality Assurance  
13 Revolving Fund. Interest shall not accrue within such sixty (60)  
14 day time period if Defendants pay the full amount of each demand  
15 for payment.

16 C. The check should reference the Phoenix-Goodyear Airport  
17 Superfund Site, and be addressed to: Arizona Department of  
18 Environmental Quality, 2005 N. Central, Phoenix, AZ 85004

19 XXIV. PRIORITY OF CLAIMS

20 Defendants' claims against any other responsible party for  
21 contribution or indemnification of all or a portion of the cost of  
22 their settlement herein shall be subordinate to any claim of the  
23 United States or the State against such other responsible party  
24 relating to the Site as to any unreimbursed costs for the response  
25 actions taken or other costs incurred by the United States and the  
26 State related to the Site, as provided for by Section 113(f)(3)(C)

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1 of CERCLA. The United States and the State shall have priority  
2 over Defendants in the collection of any judgment obtained against  
3 any non-settling responsible party. Defendants shall notify EPA  
4 and the State of any contribution or indemnification action with  
5 regard to the Site.

6 XXV. ENDANGERMENT AND EMERGENCY RESPONSE

7 In the event of any action or occurrence during the  
8 performance of the Work which causes or threatens a release of  
9 hazardous substances greater than reportable quantities as defined  
10 in Section 103 of CERCLA, or which may present an immediate threat  
11 to public health or welfare or the environment, Defendants shall  
12 immediately take all appropriate action to prevent, abate, or  
13 minimize such release or endangerment, and shall immediately notify  
14 EPA's Project Coordinator, or, if the Project Coordinator is  
15 unavailable, Defendants shall notify the EPA Emergency Response  
16 Unit Region IX. Defendants shall take such response action in  
17 accordance with all applicable provisions of the Work required by  
18 this Consent Decree. In the event that Defendants fail to take  
19 appropriate response action as required by this Section, and EPA  
20 takes such action instead, Defendants shall reimburse EPA all costs  
21 of the response action that are incurred in a manner not  
22 inconsistent with the NCP. Payment of such costs of response shall  
23 be made in the manner described in Section XXI (Reimbursement of  
24 U.S. Future Response and Oversight Costs) within sixty (60) days  
25 of Defendants' receipt of demand for payment.



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1           d. In the event that EPA and the State take the  
2 enforcement action described in Subparagraph 1.b. jointly, one-half  
3 of all penalties payable shall be remitted to the State and one-  
4 half shall be remitted to EPA.

5           2. The United States or the State, as provided in this  
6 Section, shall give Defendants written notification of Defendants'  
7 failure to comply with any requirement of this Consent Decree in  
8 an adequate manner and identify the class of noncompliance. The  
9 notice also shall indicate the amount of penalties currently due,  
10 and the rate of accrual for continuous violations. Failure of the  
11 United States or the State to provide Defendants with notice under  
12 this Subparagraph A.2 shall not stay the accrual of stipulated  
13 penalties for any violation.

14           3. All penalties shall begin to accrue on the first  
15 (1st) day after (a) the deadline on which complete performance is  
16 due or (b) a violation occurs or (c) for laboratory analysis, the  
17 date of Defendants' receipt of sample results which demonstrate  
18 noncompliance, and continue to accrue until the requirement is  
19 satisfied, unless performance is excused pursuant to this Consent  
20 Decree. Nothing herein shall prevent the simultaneous accrual of  
21 separate penalties for separate violations of this Consent Decree.

22           3. Stipulated penalties to the United States under this  
23 Section shall be paid upon demand by the United States by certified  
24 check made payable to the Hazardous Substance Superfund, and  
25 addressed as indicated in Section XXI (Reimbursement of U.S. Future  
26 Response and Oversight Costs). Stipulated penalties to the State  
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1 under this Section shall be paid upon demand by the State by  
2 certified or cashier's check made payable to Arizona Department of  
3 Water Resources and addressed to ADWR, Legal Division, c/o Chief  
4 Enforcement Attorney, 15 S. 15th Avenue, Phoenix, Arizona 85007.  
5 All stipulated penalties under this Section shall be paid within  
6 sixty (60) days of Defendants' receipt of the written demand for  
7 payment of stipulated penalties. Failure to pay a stipulated  
8 penalty on time also constitutes an event subject to stipulated  
9 penalties. Defendants shall submit a copy of the check to the  
10 United States in accordance with the directions set forth in  
11 Section XXIX (Form of Notice) herein. The check shall be  
12 accompanied by a letter that includes identification of this  
13 Consent Decree and a brief description of the triggering event.

14 4. Payment of stipulated penalties shall not preclude  
15 EPA from electing to pursue any other remedy or sanction to enforce  
16 this Consent Decree, and nothing shall preclude EPA from seeking  
17 statutory penalties against Defendants for violations of this  
18 Decree or of the statutes and regulations upon which it is based.

19 5. In the event EPA assumes the performance of a portion  
20 or all of the Work under this Decree, Defendants will be liable for  
21 stipulated penalties pursuant to this Section. Defendants shall  
22 pay an additional stipulated penalty ("Work Assumption Penalty")  
23 of \$500,000 if the United States or its designate assumes  
24 performance of a portion or all of the Work. If EPA performs all  
25 or portions of the Work because of Defendants' failure to comply  
26 with its obligations under this Decree, Defendants shall reimburse  
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1 EPA for the costs of doing such work within thirty (30) days of  
2 receipt of demand for payment of such costs.

3 6. Any noncompliance with such EPA-approved reports, plans,  
4 specifications, schedules, appendices, and attachments shall be  
5 considered a failure to comply with this Consent Decree and subject  
6 to stipulated penalties as governed by this Section.

7 B. Defendants shall pay the following stipulated penalties  
8 per day for each failure to comply with the requirements of this  
9 Decree:

10 1. Class I

11 a. Class I violation shall include:

12 i. Submission of deficient or delinquent progress  
13 reports required by Section VIII.A.

14 ii. Failure to submit analytical or design data  
15 required by Section XVI.B.

16 b. Defendants shall pay stipulated penalties of \$500 per  
17 day for each Class I violation; provided, however, that penalties  
18 shall cease to accrue if the required information is provided in  
19 a subsequent progress report.

20 2. Class II

21 a. Class II violation shall include:

22 i. After commencement of routine operations,  
23 failure to maintain a zone of capture or to otherwise comply with  
24 the requirements of Section VII.C.3.

25 ii. Failure to meet air emission limits or to  
26 comply with the requirements of Section VII.C.8.

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iii. Failure to provide well-head treatment as required by Section VII.C.2.

iv. Failure to comply with the requirements of Section VII.D.6 (design memorandum for SVE).

v. Failure to comply with the requirements of Sections VII.D.8 (conceptual design for SVE).

vi. Failure to comply with the requirements of VII.D.10 & 15 (final design and specifications for SVE).

vii. Failure to commence and continue SVE work in accordance with the requirements of Sections VII.D.12 & 13.

viii. Failure to comply with the requirements of Sections VII. C.7 & D.14 (SVE Operation and Maintenance).

ix. Failure to comply with the SVE Operation and Maintenance Plan.

x. Failure to comply with the requirements of Section VII.D.3. (contaminant transport well report).

xi. Failure to comply with the requirements of Section VII.D.5 (response activities for contaminant transport wells).

xii. Failure to comply with the requirements of Section VII.D.16 (Field Investigation Work Plan).

xiii. Failure to commence and continue response activities under Field Investigation Work Plan.

xiv. Failure to comply with the requirements of Section VII.D.18 (Conceptual Design for Groundwater Remedy).

xv. Failure to comply with the requirements of Section VII.D.20 (final draft design for Groundwater Remedy).

xvi. Failure to comply with the requirements of Section VII.D.22 (preliminary O&M plan for Groundwater Remedy).

xvii. Failure to comply with the requirements of Sections VII.C.5, VII.D. 26, 28, & 29 (submittal and compliance with requirements of final O&M plan for Groundwater Remedy).

xviii. Failure to comply with the requirements of Sections VII.D.24 & 25 (construction and start-up for Groundwater Remedy).

xix. Failure to submit and continue compliance with the requirements of the Operation and Maintenance Plan for the Operable Unit Remedy in accordance with Sections VII.C.9.and VII.D.29 & 31.

b. Defendants shall pay the following stipulated penalties for each Class II violation:

<u>Period of Noncompliance</u>	<u>Penalty Per Day Per Violation</u>
Days 1 - 10	\$3,500
Days 11-20	\$8,000
Days 21-45	\$ 12,000
After 46 days	\$25,000

### 3. Class III

a. Class III violations shall include:

i. All discharges of VOCs in excess of the treatment plant discharge levels established in this Consent Decree measured at the point of compliance during the period of time

1 beginning two (2) months after Defendants' commencement of start-  
2 up of the Work to the date of commencement of routine operations.

3 ii. All discharges of VOCs in excess of treatment  
4 plant discharge levels established in this Consent Decree after  
5 routine operations are commenced.

6 b. Defendants shall be deemed to be in violation from  
7 the date of Defendants' receipt of sample results which demonstrate  
8 noncompliance and for each day thereafter until sample results  
9 demonstrate compliance. Stipulated penalties for this class of  
10 violations shall accrue pursuant to the following schedule:

11 Penalty Per Day of Violation under Subsection 3(a)(i)

12 Up to one order of magnitude over 13 Table 2-5 levels	Up to two orders of magnitude over Table 2-5 levels	Over two orders of magnitude over Table 2-5 levels
\$500.	\$1,500.	\$2,500.

14 Penalty Per Day of Violation under Subsection 3(a)(ii)

15 Period of 16 Noncompliance	Up to one order of magnitude over Table 2-5 17 levels	Up to two orders of magnitude over Table 2-5 levels	Over two orders of magnitude- over Table 2-5 levels
18 Days 1-7	\$2,000	\$3,000	\$4,000
19 Days 8-14	\$3,000	\$4,000	\$6,000
20 Days 15-21	\$5,000	\$6,000	\$12,000
21 After 22 days	\$8,000	\$10,000	\$20,000

22 c. Defendants may re-sample treatment plant effluent within  
23 twenty-four (24) hours of Defendants' receipt of sample results and  
24 demonstrate to the satisfaction of EPA that a sample result does  
25 not accurately reflect the concentration of VOCs actually  
26 discharged by Defendants. Defendants must make such showing to EPA  
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1 within forty-eight (48) hours of Defendants' collection of the  
2 verification sample. In the event that Defendants' re-sampling (the  
3 verification sample) does not demonstrate compliance with this  
4 Consent Decree, stipulated penalties are due from the date of  
5 Defendants' initial receipt of sample results demonstrating  
6 noncompliance. If, however, Defendants are able to demonstrate  
7 compliance after re-sampling, stipulated penalties shall not be  
8 assessed.

9 d. After seven (7) days of violation of any order of  
10 magnitude under Subparagraph (a)(ii), the next violation (of any  
11 order) shall be assessed in the second (Days 8-14) tier. After  
12 fourteen (14) days of violation of any order of magnitude, the next  
13 violation (of any order) shall be assessed in the third (Days 15-  
14 21) tier. After twenty one (21) days of violation of any order of  
15 magnitude, the next violation (of any order) shall be assessed in  
16 the fourth (After 22 days) tier.

17 4. All other failures to comply with this Consent Decree in  
18 a timely or adequate manner that are not Class I, Class II, or  
19 Class III violations shall be subject to the following stipulated  
20 penalties:

21 <u>Period of Noncompliance</u>	<u>Penalty Per Violation Per Day</u>
22 Days 1-20	\$2,500.
23 Days 21-45	\$7,500
24 After 46 days	\$12,500

25 C. No payments made under this Section shall be tax  
26 deductible for Federal or State tax purposes.



1 D. Notwithstanding any other provision of this Section, EPA  
2 or the State as provided for in this Section, may, in their sole  
3 discretion, reduce or waive stipulated penalties for a violation  
4 of this Consent Decree.

5 XXVII. DISPUTE RESOLUTION

6 A. Disputes With Defendants

7 1. In the event that the parties cannot resolve any dispute  
8 arising under this Consent Decree, then the interpretation advanced  
9 by EPA shall be considered binding unless Defendants invoke the  
10 dispute resolution provisions of this Section. Defendants'  
11 decision to invoke dispute resolution shall not constitute a Force  
12 Majeure under Section XXVIII (Force Majeure) herein.

13 2. Any dispute between the parties which arises under or with  
14 respect to this Consent Decree shall in the first instance be the  
15 subject of informal negotiations between EPA, the State, and  
16 Defendants. Such period of informal negotiations shall continue  
17 for forty-five (45) days from the time the dispute arises, unless  
18 the parties agree otherwise. The dispute shall be considered to  
19 have arisen when one party notifies the other parties in writing  
20 that there is a dispute.

21 3. In the event of unsuccessful informal negotiations, if  
22 Defendants choose not to accept EPA's position, Defendants may file  
23 with the Court a petition which shall describe the nature of the  
24 dispute and include a proposal for its resolution. Defendants may  
25 not file such a petition until informal negotiations are completed.  
26 The filing of a petition asking the Court to resolve a dispute  
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1 shall not of itself postpone the deadlines for Defendants to meet  
2 their obligations under this Consent Decree with respect to the  
3 disputed issue, or stay the provisions of Section XXVI (Stipulated  
4 Penalties), except that Defendants shall not be obligated to pay  
5 penalties accrued as to the disputed issue until completion of the  
6 dispute resolution process.

7 4. The United States shall have sixty (60) days to respond  
8 to the petition. In proceedings on any dispute, Defendants shall  
9 bear the burden of demonstrating by a preponderance of the evidence  
10 that the EPA decision is inconsistent with the NCP, arbitrary and  
11 capricious or otherwise not in accordance with law. Judicial  
12 review of any issues concerning the selection or adequacy of any  
13 response action taken or ordered by EPA shall be limited to the  
14 administrative record pursuant to Section 113(j) of CERCLA, 42  
15 U.S.C. Section 9613(j). If the Court finds that Defendants have  
16 satisfied their burden and therefore are the prevailing party in  
17 the dispute, Defendants shall pay no stipulated penalties for  
18 failing to timely perform the disputed actions. In the event of  
19 a dispute, Defendants shall continue its undisputed activities  
20 required by this Consent Decree pending resolution of the dispute.

21 5. If the Court does not find that Defendants have satisfied  
22 their burden, Defendants upon demand of the EPA, shall transmit  
23 payment of all penalties which have accrued during the dispute,  
24 plus interest at the rate specified in 28 U.S.C. Section 1961, plus  
25 two percent (2%), to the Hazardous Substances Superfund within  
26 fifteen (15) working days of resolution of the dispute.  
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1       B. Disputes Between EPA and the State

2       1. The State shall notify EPA of its intent to enforce  
3 noncompliance with this Decree involving violations of Title 45 and  
4 49 of the Arizona Revised Statutes. If EPA approves such action,  
5 it shall notify the State and Defendants in writing. If EPA fails  
6 to approve such action within forty-eight (48) hours, the State and  
7 EPA shall be considered in informal dispute. In addition, if EPA  
8 and the State disagree concerning the State's  
9 proposed disposition of any such action, the State and EPA shall  
10 be considered in informal dispute. The State and EPA shall attempt  
11 to resolve any disagreement expeditiously and informally. At the  
12 expiration of an informal negotiation period not to exceed fourteen  
13 (14) days, EPA shall issue a written Statement of Position.

14       2. If the State disagrees with EPA's Statement of Position,  
15 it shall submit a notice of dispute to EPA within ten (10) days of  
16 issuance of EPA's Statement of Position. The notice of dispute  
17 shall be accompanied by a written statement of the issues. In  
18 dispute, the relevant facts upon which the dispute is based, the  
19 factual data, analysis or opinion supporting the State's position  
20 and all supporting documentation on which the State relies  
21 (hereinafter the "State's Supporting Statement"). The EPA shall  
22 serve EPA's Supporting Statement to the State no later than ten  
23 (10) working days after receipt of the State's Supporting  
24 Statement.

25       3. An administrative record of any dispute under this  
26 Subparagraph B shall be maintained by EPA. The record shall  
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1 include the notice of dispute and the Supporting Statement of both  
2 parties, and any other material relied upon by the decision-  
3 maker(s).

4 4. The Deputy Director for Superfund, EPA Region IX, and the  
5 Assistant Director of the Arizona Department of Environmental  
6 Quality (in the case of a Title 49 dispute) or the Director of the  
7 Department of Water Resources (in the case of a Title 45 dispute)  
8 shall review the administrative record of the dispute, shall confer  
9 with each other concerning the dispute, and attempt to reach a  
10 joint decision resolving the dispute. If a joint decision is  
11 reached, the decision shall be documented by a joint Final  
12 Statement of Position, which shall be served on all parties.

13 5. If no joint decision is reached under this Subparagraph  
14 F, the Deputy Director for Superfund, U.S. EPA Region IX, shall  
15 issue a "Final Statement of Position" within thirty (30) days from  
16 receipt of the notice of dispute, which shall be served on all  
17 parties.

18 6. In the event the State seeks judicial resolution of the  
19 dispute, it shall file a petition with the Court within ten (10)  
20 days of receipt of the Final Statement of Position. Judicial  
21 review shall be limited to the administrative record and shall be  
22 in accordance with the standard of review applicable under CERCLA  
23 and any other applicable law. Unless reversed or remanded by the  
24 Court, EPA's Final Statement of Position shall be controlling as  
25 between EPA and the State.

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1 XXVIII. FORCE MAJEURE

2 A. Defendants shall perform all the requirements of this  
3 Consent Decree according to the time limits set out in the Consent  
4 Decree and referenced supporting documents or any modification  
5 thereto unless their performance is prevented or delayed by events  
6 which constitute a Force Majeure.

7 B. "Force Majeure" for purposes of this Consent Decree is  
8 defined as any event arising from causes beyond the control of  
9 Defendants or their authorized representatives (including but not  
10 limited to its officers, directors, agents, employees, contractors,  
11 subcontractors, successors, and assigns) which delays or prevents  
12 the timely performance of any obligation under this Consent Decree,  
13 and could not have been overcome or prevented by Defendants' due  
14 diligence to avoid the delay. Defendants shall have the burden of  
15 proving that the delay was caused by circumstances beyond the  
16 control of Defendants and that Defendants exercised due care and  
17 due diligence to anticipate any potential Force Majeure event and  
18 to address the effects of any potential force majeure event (1) as  
19 it is occurring and (2) following the potential Force Majeure  
20 event, such that the delay is minimized to the greatest extent  
21 possible. Defendants reserve the right to demonstrate that under  
22 appropriate circumstances, events beyond the control of Defendants  
23 include but are not limited to: adverse weather conditions;  
24 injunctions and other orders issued by courts or administrative  
25 agencies; delay associated with achieving the requirements of  
26 Section VII (Work to be Performed) because to do so would not be  
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1 consistent with any amendments to the 1989 ROD resulting from  
2 information submitted to EPA by Defendants pursuant to Section  
3 300.825(c) of the NCP; unanticipated break-down or accident to  
4 machinery, equipment, or lines of pipe despite diligent  
5 maintenance; delay in obtaining access to property upon which the  
6 Work is to be performed, provided Defendants have used due  
7 diligence to secure such access in accordance with the requirements  
8 of this Decree; and delay in obtaining permits or approvals  
9 required for the Work provided Defendants have submitted all  
10 applications and other necessary documents in a timely manner. EPA  
11 reserves the right to contend that any of the above circumstances  
12 do not constitute a Force Majeure event.

13 C. Force Majeure shall not include increased costs or  
14 expenses of any Work performed under this Consent Decree, nor the  
15 financial inability of Defendants to perform such Work, nor the  
16 failure of Defendants to make timely application for any required  
17 permits or approvals, and to provide all information required  
18 therefor in a timely manner.

19 D. Defendants shall have the burden of proving by a  
20 preponderance of the evidence that any delay is or will be a Force  
21 Majeure event and that the duration of the delay requested is  
22 necessary to compensate for that event.

23 E. In the event of a Force Majeure, the time for performance  
24 of the activity delayed by the Force Majeure shall be extended for  
25 the minimum time necessary to allow completion of the delayed  
26 activity but in no event for a period longer than the period of the  
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1 delay attributable to the Force Majeure. The time for performance  
2 of any activity dependent on the delayed activity shall be  
3 similarly extended. EPA shall determine whether and to what extent  
4 the time for performance shall be extended. Defendants shall adopt  
5 all practicable measures to avoid or minimize any delay caused by  
6 a Force Majeure.

7 F. In the event Defendants discover an event which Defendants  
8 believe is a Force Majeure, Defendants shall orally notify EPA's  
9 Project Coordinator no later than two (2) working days after  
10 Defendants become aware of the occurrence of such event.  
11 Defendants shall notify EPA, in writing, no later than twelve (12)  
12 days after oral notification is due under this Subparagraph.  
13 Written notification shall include an explanation of why the event  
14 meets the requirements of Force Majeure under this Section, which  
15 of the tasks are directly affected by the delay, the measures taken  
16 and to be taken to prevent or minimize the delay, and a statement  
17 as to whether in Defendants' opinion, such event may cause or  
18 contribute to an endangerment to public health, welfare, or the  
19 environment.

20 G. EPA shall determine whether the event constitutes Force  
21 Majeure and so notify Defendants in writing. If EPA agrees that  
22 a delay is or was attributable to the Force Majeure event, EPA and  
23 Defendants shall modify the requirements of the Work (1) to provide  
24 such additional time or (2) as may be otherwise required under  
25 Section XXX (Modification), as may be necessary to allow the  
26 completion of the specific phase of Work and/or any succeeding  
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1 phase of the Work affected by such delay, with such additional time  
2 not to exceed the actual duration of the delay. An extension of  
3 the time for performance of the obligation directly affected by the  
4 Force Majeure event shall not, of itself, extend the time for  
5 performance of any subsequent obligation but in appropriate cases  
6 may require such an extension. If EPA determines that the event  
7 did not constitute Force Majeure then any delay caused by the event  
8 claimed to be Force Majeure by Defendants shall constitute  
9 noncompliance with the Consent Decree and penalties shall accrue  
10 from the date of noncompliance. In the event that EPA and  
11 Defendants cannot agree that any delay in the Work has been or will  
12 be caused by a Force Majeure event, or as to the appropriate length  
13 of the delay, the dispute shall be resolved in accordance with  
14 Section XXVII (Dispute Resolution). In any such proceeding,  
15 Defendants shall have the burden of demonstrating by a  
16 preponderance of the evidence that the delay or anticipated delay  
17 has been or will be caused by a Force Majeure event, that the  
18 duration of the delay was or will be warranted under the  
19 circumstances, and that Defendants complied with the requirements  
20 of this Section.

21 H. In determining whether Defendants have exercised due  
22 diligence to overcome or prevent a Force Majeure event, EPA shall  
23 consider Defendants' compliance with the requirements of this  
24 Section.

25 I. Failure to comply with the requirements of this Section  
26 shall preclude Defendants from asserting any claim of Force



1 Majeure.

XXIX. FORM OF NOTICE

2 When notification to or communication with EPA, Defendants or  
3 the State is required by the terms of this Consent Decree, it shall  
4 be in writing, postage prepaid, and addressed as follows:

5 As to EPA

6 [EPA Project Coordinator - PGA Site]  
7 Superfund Enforcement Branch (H-7-2)  
8 U.S. Environmental Protection Agency  
9 75 Hawthorne Street  
10 San Francisco, CA 94107

11 As to Defendants

12 The Goodyear Tire & Rubber Company  
13 Manager  
14 Corporate Environmental Engineering  
15 1144 East Market Street  
16 Akron, OH 44316

17 Loral Defense Systems-Arizona  
18 James F. Price  
19 P.O. Box 85  
20 Litchfield Park, AZ 85340-0085

21 As to the State

22 [State Project Coordinator - PGA Site]  
23 Arizona Department of Environmental Quality  
24 2005 N. Central Avenue  
25 Suite 400  
26 Phoenix, Arizona 85004

27 [State Project Coordinator - PGA Site]  
28 Arizona Department of Water Resources  
15 South 15th Avenue  
Phoenix, Arizona 85007

Any submission to EPA or the State for approval pursuant to  
this Consent Decree shall be made to the address shown above and  
shall be made by overnight mail or some equivalent delivery  
service.

XXX. MODIFICATION

The parties recognize that information or data gathered during  
the performance of the Work required by this Consent Decree may

1 indicate that modifications to the Work are necessary to accomplish  
2 the objectives of this Consent Decree. In that event, Defendants  
3 or EPA may recommend in writing modifications to the Work or the  
4 schedule for the Work's performance. Such modifications shall not  
5 be made prior to their written approval by EPA. If EPA denies a  
6 request for modification by Defendants, Defendants may invoke the  
7 dispute resolution process of Section XXVII (Dispute Resolution).  
8 Any modifications ultimately made shall be memorialized in writing  
9 by EPA, made available to Defendants, and constitute a modification  
10 of the Work.

11 There shall be no modification of this Consent Decree without  
12 written approval of all parties to this Consent Decree.

13 XXXI. ADMISSIBILITY OF DATA

14 In the event that the Court is called upon to resolve a  
15 dispute arising under this Consent Decree, the parties waive any  
16 evidentiary objection to the admissibility into evidence of data  
17 gathered, generated or evaluated pursuant to this Consent Decree  
18 that has been verified using the Quality Assurance and Quality  
19 Control procedures specified in Section X (QA/QC) of this Decree.

20 XXXII. INDEMNIFICATION AND INSURANCE

21 A. Defendants shall indemnify the United States and the State  
22 and hold the United States and the State harmless for any claims  
23 arising from any injuries or damages to persons or property  
24 resulting from any acts or omissions of Defendants, their officers,  
25 directors, employees, agents, receivers, trustees, successors,  
26 assigns, contractors, subcontractors, or any other person acting  
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1 on their behalf or under their control in carrying out this Consent  
2 Decree. In the event of any suit alleging such injuries or  
3 damages, the United States or the State will defend in good faith  
4 against such suit to the extent consistent with the applicable law;  
5 provided, however, that there shall be no judicial review of any  
6 efforts made by the United States or the State to defend against  
7 such suit. The United States or the State are not parties in any  
8 contract involving Defendants at the Site.

9 B. The United States or the State shall provide notice to  
10 Defendants of any such suit within sixty (60) days of its service  
11 upon the United States or the State. The United States or the  
12 State shall provide Defendants with an opportunity to confer with  
13 the United States or the State before settling any such suit.  
14 Rights of participation by Defendants in any such suit shall be  
15 governed by the Federal Rules of Civil Procedure.

16 C. Pursuant to the authorities in Section 119 of CERCLA,  
17 Defendants shall have the right to seek indemnification from the  
18 United States for response action contractors retained to perform  
19 the Work insofar as such indemnification is authorized by Section  
20 119 of CERCLA.

21 D. No later than ten (10) days prior to commencing any Work,  
22 Defendants shall secure, and shall maintain until the fifth (5th)  
23 anniversary of the termination of this Consent Decree: (1)  
24 comprehensive general liability and automobile insurance with  
25 limits of Ten Million Dollars (\$10,000,000), combined single limit;  
26 (2) professional liability insurance with limits of at least one  
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1 Million Dollars (\$1,000,000) per occurrence; and (3) employer's  
2 liability insurance with limits of at least One Million Dollars per  
3 occurrence (\$1,000,000), in each case naming as insured the United  
4 States. Defendants may provide a demonstration to EPA that it will  
5 self-insure with regard to the liabilities addressed in this  
6 Subparagraph.

7 2. In addition, for the duration of this consent Decree,  
8 Defendants shall satisfy, or shall ensure that their contractors  
9 or subcontractors satisfy, all applicable laws and regulations  
10 regarding the provision of workmen's compensation insurance for all  
11 persons performing the Work on behalf of Defendants in furtherance  
12 of this Consent Decree. Prior to commencement of the Work under  
13 this Consent Decree, Defendants shall provide to EPA certificates  
14 of such insurance and a copy of each insurance policy. If  
15 Defendants demonstrate by evidence satisfactory to EPA that any  
16 contractor or subcontractor maintains insurance equivalent to that  
17 described above, or insurance covering the same risks but in a  
18 lesser amount, then, with respect to that contractor or  
19 subcontractor, Defendants need provide only that portion of the  
20 insurance described above which is not maintained by the contractor  
21 or subcontractor.

#### 22 XXXIII. COVENANT NOT TO SUE

23 A. Except as specifically provided in Subparagraph C below,  
24 the United States and the State covenant not to sue Defendants or  
25 their officers, directors, employees, agents, successors, or  
26 assigns, under the provisions of CERCLA, and under Titles 45 and  
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1 49 of the Arizona Revised Statutes, with regard to the Covered  
2 Matters which are the subject of this Consent Decree. For purposes  
3 of this Section "Covered Matters" shall include any and all civil  
4 and administrative liability to EPA and the State for causes of  
5 action arising under Sections 106 and 107(a) of CERCLA, Section  
6 7003 of RCRA, and Titles 45 and 49 of the Arizona Revised Statutes  
7 for performance of the Work and response costs paid by Defendants  
8 under Sections XXI (Reimbursement of U.S. Future Response and  
9 Oversight Costs), XXII (Reimbursement of U.S. Past Response Costs),  
10 and XXIII (Reimbursement of State Past Response, Future Response,  
11 and Oversight Costs) of this Consent Decree. Covered Matters shall  
12 also include civil liability for damages under Section 107(f) of  
13 CERCLA, 42 U.S.C. Section 9607(f) for injury to, destruction of,  
14 or loss of natural resource damages caused by releases of hazardous  
15 substances at the Site.

16 B. With respect to the Work and payment of United States and  
17 State future response and oversight costs, this covenant not to sue  
18 shall take effect upon certification by EPA of the completion of  
19 the remedial action in accordance with Section XX (Certification  
20 of Completion) of this Consent Decree. With respect to payment  
21 of United States and State past response costs, this covenant not  
22 to sue shall take effect upon Defendants' compliance with the  
23 requirements of Section XXII (Reimbursement of U.S. Past Response  
24 Costs) and Section XXIII (Reimbursement of State Past Response,  
25 Future Response, and Oversight Costs). This Section is not, and  
26 shall not be construed as, a covenant not to sue Defendants .:

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1 Defendants do not fulfill their obligations arising out of this  
2 Consent Decree or a covenant not to sue any other person or entity  
3 not a party to this Consent Decree.

4 C. Notwithstanding any other provision of this Consent  
5 Decree, the United States and the State reserve the right to  
6 institute proceedings in this action or in a new action seeking to  
7 compel Defendants to perform any additional response work at the  
8 Site, or to reimburse the United States or the State for Response  
9 Costs, or to reimburse the United States or the State for natural  
10 resource damages if:

11 (1) Prior to U.S. EPA certification of completion of  
12 the Work,

13 a. conditions at the Site, previously unknown to  
14 the United States or the State, are discovered after the entry of  
15 this Consent Decree, or

16 b. information is received, in whole or in part,  
17 after the entry of this Consent Decree, and these previously  
18 unknown conditions or this information indicates that the Work is  
19 not protective of human health and the environment;

20 (2) Subsequent to U.S. EPA certification of completion  
21 of the Work,

22 a. conditions at the Site, previously unknown to  
23 the United States or the State, are discovered after the  
24 certification of completion by EPA, or

25 b. information received, in whole or in part, after  
26 the certification of completion by EPA, and these previously,  
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1 unknown conditions or this information indicates that the Work is  
2 not protective of human health and the environment.

3 D. Notwithstanding any other provision in this Consent  
4 Decree, this covenant not to sue shall not relieve Defendants of  
5 their obligation to meet and maintain compliance with the  
6 requirements set forth in this Consent Decree or the 1988 Consent  
7 Decree.

8 E. The covenant not to sue set forth herein does not pertain  
9 to any matters other than those expressly specified to be Covered  
10 Matters. The United States and the State reserve, and this Consent  
11 Decree is without prejudice to, all rights against Defendants with  
12 respect to all other matters. In addition, the following are  
13 specifically identified as matters that are not Covered Matters:

14 (1) Claims based on a failure by Defendants to meet the  
15 obligations of this Decree;

16 (2) Liability arising from past, present, or future  
17 disposal, release, or threat of release of hazardous substances,  
18 pollutants or contaminants outside of the Site and which is  
19 attributable to the Site conditions;

20 (3) Liability for the disposal of any hazardous  
21 substances taken from the Site;

22 (4) Claims of the United States for any other costs or  
23 actions at the Site which are not expressly and exclusively  
24 undertaken pursuant to the terms of this consent Decree;

25 (5) Claims based on criminal liability;

1 (6) Any matter as to which the United States is owed  
2 indemnification under Section XXXII (Indemnification) above; and

3 (7) Liability for violations of Federal or State law  
4 which occur during implementation of the Work.

5 F. Nothing in this Consent Decree shall constitute or be  
6 construed as a release or covenant not to sue regarding any claim  
7 or cause of action against any person as defined in Section 101(21)  
8 of CERCLA, or other entity not a signatory to this Consent Decree  
9 for any liability it may have arising out of or relating to the  
10 Site.

11 XXXIV. RESERVATION OF RIGHTS

12 A. The United States and the State expressly reserve all  
13 rights and defenses they may have, including the right to  
14 disapprove of Work performed by Defendants under this Consent  
15 Decree, to take enforcement action for violations of this Decree,  
16 and to take any enforcement action pursuant to CERCLA and/or any  
17 other authority, except as provided in Section XXXIII (Covenant  
18 Not To Sue).

19 B. Nothing in this Consent Decree shall be deemed to limit  
20 the response authority of EPA under Section 104 of CERCLA, 42  
21 U.S.C. Section 9604, and under Section 106 of CERCLA, 42 U.S.C.  
22 Section 9606, or under any other federal response authority. In  
23 the event the United States exercises such response authority, the  
24 United States reserves the right to seek reimbursement from  
25 Defendants for such costs incurred by the United States.

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1 C. The parties recognize that Defendants are entering into  
2 this Consent Decree as a compromise of disputed claims and that  
3 Defendants do not admit, accept, or intend to acknowledge any  
4 liability or fault with respect to any matter arising out of or  
5 relating to the Site. Defendants retain the right to controvert  
6 the validity of any factual or legal claims or determinations made  
7 herein by EPA and the State, except that Defendants do not contest  
8 the entry of this Consent Decree and agree to be bound by its  
9 terms.

10 D. Defendants hereby release and covenant not to sue the  
11 United States, including any and all departments, agencies,  
12 instrumentalities, officers, administrators, and representatives  
13 thereof, and the Hazardous Substance Superfund, for any claim,  
14 counter-claim, or cross-claim that was asserted or could have been  
15 asserted prior to the effective date of this Consent Decree arising  
16 out of or relating to the Site, except that Defendants reserve all  
17 rights they may have to make a claim or counter-claim against the  
18 Department of Defense, the Department of the Navy, Department of  
19 the Army through the Army Corps of Engineers, the Defense Plant  
20 Corporation, The Reconstruction Finance Corporation, and the  
21 General Services Administration. Defendants further reserve all  
22 rights and defenses to assert claims against any non-federal  
23 potentially responsible parties (PRPs) which are not signatories  
24 to this Consent Decree with respect to any agreements relating to  
25 performance of the Work under this Consent Decree. The Defendants  
26 also release and covenant not to sue the State, including any and  
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1 all officers, administrators, and representatives thereof, for any  
2 claim, counter-claim, or cross-claim that was asserted or could  
3 have been asserted prior to the effective date of this Consent  
4 Decree arising out of or relating to the Site.

5 E. With regard to claims for contribution against Defendants  
6 for matters addressed in this Consent Decree, the parties hereto  
7 agree that Defendants are entitled, as of the entry of this Consent  
8 Decree, to such protection from contribution actions or claims as  
9 provided in CERCLA section 113(f)(2), 42 U.S.C. Section 9613(f)(2).  
10 Defendants may seek contribution, pursuant to Section 113(f) of  
11 CERCLA, from any other person who is liable or potentially liable  
12 under Section 107 of CERCLA, 42 U.S.C. Section 9607.

13 F. Defendants reserve their rights to supplement the  
14 administrative record pursuant to Section 300.825(c) of the NCP.

15 G. The State of Arizona has expended funds under the Water  
16 Quality Assurance Revolving Fund by the provision of grant monies  
17 to the City of Goodyear. It is the State's belief that these funds  
18 for remedial actions undertaken by the City of Goodyear are related  
19 to the contamination emanating from this Site. Nothing in this  
20 Consent Decree shall preclude the State from initiating legal  
21 action under either Title 49 of the Arizona Revised Statutes or  
22 under CERCLA, 42 U.S.C. §§ 9601 et seq., in order to recover those  
23 grant funds provided by the State Water Quality Assurance Revolving  
24 Fund (WQARF) to the City of Goodyear. Defendants are barred from  
25 using this Consent Decree either affirmatively or defensively in  
26 any matter whatsoever to preclude the State from initiating  
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1 appropriate legal actions in attempting to recover costs of its  
2 WQARF grant funds to the City of Goodyear. However, Defendants  
3 retain all other rights or defenses they may have against such  
4 actions under applicable Federal or State statutes and laws.

5 XXXV. SECTION HEADINGS

6 The section headings set forth in this Consent Decree and its  
7 Table of Contents are included for convenience of reference only  
8 and shall be disregarded in the construction and interpretation of  
9 any of the provisions of this Consent Decree.

10 XXXVI. COMMUNITY RELATIONS

11 EPA, the State, and Defendants shall cooperate in providing  
12 information regarding the Work to the public. As requested by EPA,  
13 Defendants shall participate in the preparation of such information  
14 for dissemination to the public and in public meetings which may  
15 be held or sponsored by EPA to explain activities at or relating  
16 to the Site.

17 XXXVII. LODGING AND PUBLIC PARTICIPATION

18 A. Pursuant to Section 122(d) of CERCLA, 42 U.S.C. Section  
19 9622(d), this Consent Decree will be lodged with the Court for a  
20 period of not less than thirty (30) days, and the United States  
21 shall publish a notice of availability of review to allow public  
22 comment prior to entry by the Court.

23 B. The United States reserves the right to withdraw or  
24 withhold its consent if the comments regarding the Consent Decree  
25 disclose facts or considerations which indicate that the Consent  
26 Decree is inappropriate, improper, or inadequate. Defendants  
27

1 consent without further notice to the entry of this Consent Decree  
2 if there is no further modification of its terms.

3 XXXVIII. OTHER CLAIMS

4 With respect to any person, firm, partnership, or corporation  
5 not a signatory to this Consent Decree, nothing in this Consent  
6 Decree shall constitute or be construed as a covenant not to sue  
7 by any signatory with respect to, or a release from any claims,  
8 cause of action, or demand in law or equity.

9 XXXIX. EFFECTIVE DATE

10 Unless otherwise provided in this Decree, this Consent Decree  
11 is effective upon the date of its entry by the Court.

12 XXXX. CONTINUING JURISDICTION

13 The Court specifically retains jurisdiction over both the  
14 subject matter of and the parties of this action for the duration  
15 of this Consent Decree for the purposes of issuing such further  
16 orders or directions as may be necessary or appropriate to  
17 construe, implement, modify, enforce, terminate, or reinstate the  
18 terms of this Consent Decree or for any further relief as the  
19 interest of justice may require.

20 XXXXI. TERMINATION AND SATISFACTION

21 A. Upon completion of the Work performed pursuant to this  
22 Consent Decree, Defendants shall submit to EPA a written  
23 certification that they have fully satisfied their obligations in  
24 accordance and in full compliance with this Consent Decree.  
25 Defendants may submit the certification for the soil vapor  
26 extraction portion of the Work upon completion of that portion of  
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1 the Work. The provisions of this Consent Decree, including  
2 Defendants' obligations for Section VII (Work to be Performed),  
3 shall be deemed satisfied upon Defendants' receipt of such written  
4 approval from EPA, provided that termination of this Consent Decree  
5 shall not alter the provisions of Section XI (Periodic Review to  
6 Assure Protection of Human health and the Environment), Section  
7 XVIII (Claims Against The Fund), XVII (Retention of Records),  
8 Section XXIV (Priority of Claims), Section XXXII (Indemnification),  
9 Section XXXIII (Covenant Not To Sue) Section XXXIV (Reservation of  
10 Rights), and such other continuing rights and obligations of  
11 Defendants under this Consent Decree.

12 XXXXII. SIGNATORIES

13 A. The undersigned representative of Defendants to this  
14 Consent Decree, the State, and the Assistant Attorney General for  
15 Land and Natural Resources of the Department of Justice certifies  
16 that he or she is fully authorized to enter into the terms and  
17 conditions of this Consent Decree and to execute and legally bind  
18 such party to this document.

19 B. Defendants shall identify, on the attached signature page,  
20 the name and address of an agent who is authorized to accept  
21 service of process by mail on behalf of that party with respect to  
22 all matters arising under or relating to this Consent Decree.  
23 Defendants hereby agree to accept service in that manner and to  
24 waive the formal service requirements set forth in Rule 4 of the  
25 Federal Rules of Civil Procedure, including service of a summons,  
26 and any applicable local rules of this Court.

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XXXXIII. COUNTERPARTS

This Consent Decree may be executed and delivered in any number of counterparts, each of which when executed and delivered shall be deemed to be an original, but such counterparts shall together constitute one and the same document.

SIGNED AND ENTERED THIS \_\_\_\_ day of \_\_\_\_\_, 1990.

\_\_\_\_\_  
UNITED STATES DISTRICT JUDGE

1 CONSENTED TO:

UNITED STATES OF AMERICA  
Plaintiff

2  
3 Dated: \_\_\_\_\_

BY:

RICHARD B. STEWART  
Assistant Attorney General  
Environment & Natural Resources Division  
United States Department of Justice  
Washington, D.C. 20530

6  
7 Dated: \_\_\_\_\_

By:

ROBERT KLOTZ  
Environmental Enforcement Section  
Land and Natural Resources Division  
United States Department of Justice  
301 Howard Street, Suite 870  
San Francisco, CA 94105

LINDA A. AKERS  
United States Attorney

11  
12  
13 Dated: \_\_\_\_\_

By:

JAMES P. LOSS  
Chief, Civil Section  
United States Attorney's Office  
4000 U.S. Courthouse  
230 N. First Avenue  
Phoenix, Arizona 85025

16  
17  
18 Dated: \_\_\_\_\_

By:

DANIEL W. MCGOVERN  
Regional Administrator  
U.S. Environmental Protection Agency  
Region IX  
1235 Mission Street  
San Francisco, CA 94103

21  
22 Dated: \_\_\_\_\_

By:

ALLYN L. STERN  
Office of Regional Counsel  
U.S. EPA Region IX

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STATE OF ARIZONA

ROBERT K. CORBIN  
Arizona Attorney General

Dated: \_\_\_\_\_

By: \_\_\_\_\_

STEVEN J. SILVER  
Assistant Attorney General  
Office of the Attorney General  
Civil Division  
1275 W. Washington  
Phoenix, AZ 85007

Dated: \_\_\_\_\_

By: \_\_\_\_\_

RANDOLPH WOOD  
Director, Arizona Department of  
Environmental Quality  
2005 N. Central Avenue  
Phoenix, AZ 85004

Dated: \_\_\_\_\_

By: \_\_\_\_\_

BARBARA A. MARKHAM  
Chief Counsel

CHARLES L. CAHOY  
Deputy Counsel  
State of Arizona Department of Water  
Resources  
15 South 15th Avenue  
Phoenix, AZ 85007



1 Dated. \_\_\_\_\_ By: \_\_\_\_\_  
2 N.W. PLUMMER  
3 Director, Arizona Department of Water  
4 Resources  
5 15 South 15th Avenue  
6 Phoenix, AZ 85007

7 DEFENDANTS

8 THE GOODYEAR TIRE & RUBBER COMPANY

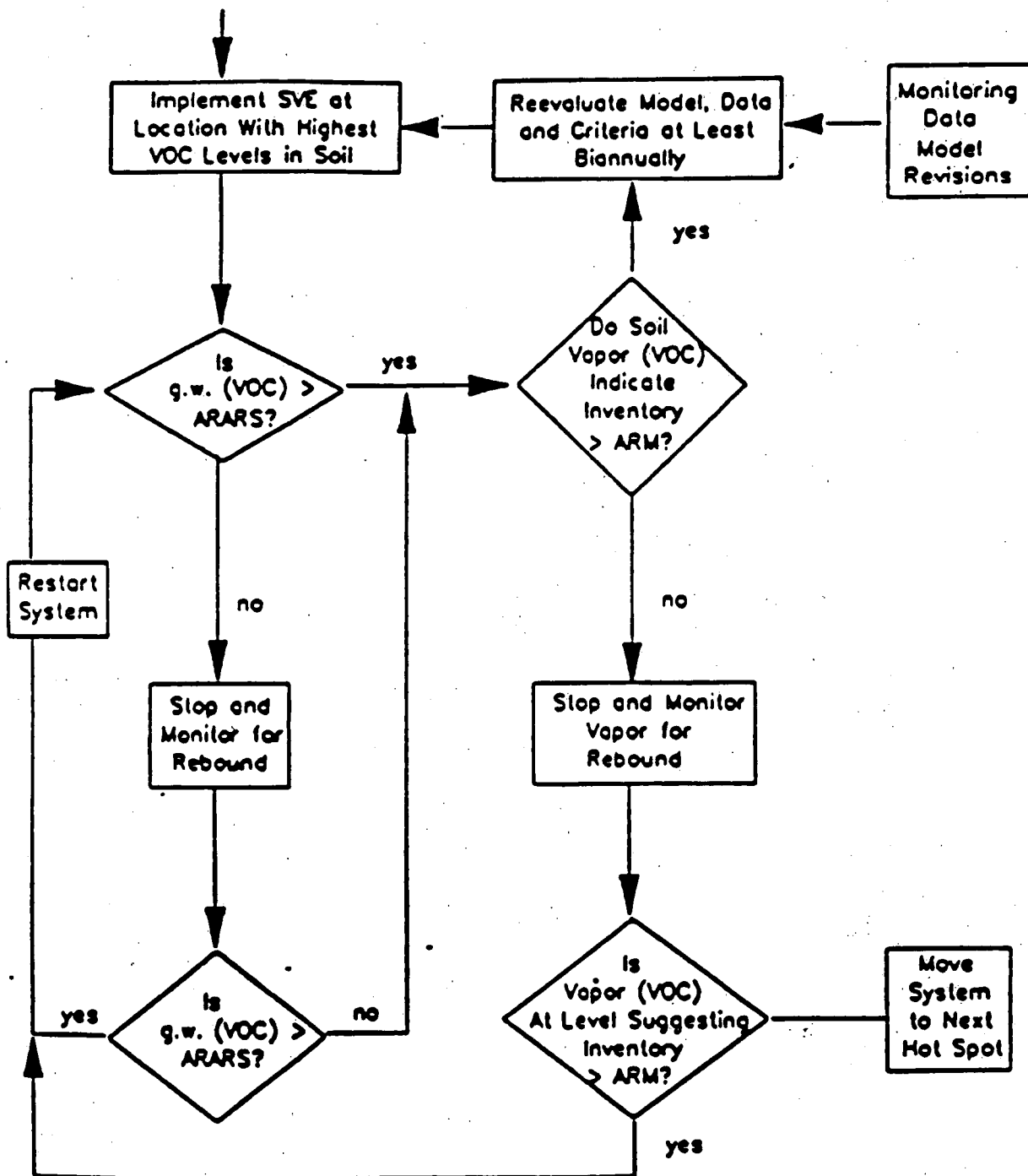
9 Dated: \_\_\_\_\_ By: \_\_\_\_\_  
10 The Goodyear Tire & Rubber Company  
11 1144 East Market Street  
12 Akron, OH 44316

13 LORAL DEFENSE SYSTEMS-ARIZONA, A  
14 DIVISION OF LORAL CORPORATION

15 Dated: \_\_\_\_\_ By: \_\_\_\_\_  
16 Loral Defense Systems-Arizona, a division  
17 of Loral Corporation  
18 P.O. Box 85  
19 Litchfield Park, AZ 8530-0085  
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Appendix "B"  
9/1990 consent decree

## PROPOSED DECISION TREE FOR OPERATION OF THE SOIL VACUUM EXTRACTION SYSTEM



**PARTIALLY SCANNED  
OVERSIZE ITEM(S)**

See document # **2299175**  
for partially scanned image(s).

For complete hardcopy version of the oversize document  
contact the Region IX Superfund Records Center